



(NASA-TM-107810) HANDBOOK OF
SOLAR-TERRESTRIAL DATA SYSTEMS, VERSION 1
(NASA) 176 p

N92-26191

G3/92 Unclass
0088546

Handbook of Solar-Terrestrial Data Systems

Version 1
November 1991



Prepared for the
Inter-Agency Consultative Group (IACG)
for Space Science

by the

NSSDC

National Space Science Data Center
NASA Goddard Space Flight Center
Greenbelt, Maryland 20771, USA



Errata

Section IV. Network-to-Network Communications

Since the original text's preparation, a number of changes have occurred in the gateways and information nodes. The following notes should be marked in the text.

Section IV.I.a, page 133:

The SPAN_DB and ESNET_DECNET_NODES tables are now found as:

NSINIC::NSI_DECNET.COM
NSINIC::ESNET_DECNET_NODES.DAT

Section IV.II.a, page 138:

Most of the references to SPAN should now read DECnet or NSI/DECnet, although the gateway address **SPAN-RELAY.AC.UK** remains as noted.

NSI/DECnet and NSI/TCP-IP networks that help in DACSII authorizations and various questions are now obtainable at the NSI Network Information Center (NIC) (the U. S. telephone remains the same as the former SPAN, 301-286-7251, but the network addresses are now **NSINIC::NETMGR** or **netmgr@nsinic.gsfc.nasa.gov**).

Section IV.II.c, pages 140-141:

To reach NASA users, the gateway to TELEMAIL from Internet has changed from the commercial **@sprint.com** to the NASA-operated **@x400.gsfc.nasa.gov**. When going to a NASA TELEMAIL address (GSFCMAIL, NASAMAIL, JPL, etc.), users should try to use the NASA operated gateway service. It is expected that access to NASA services through the commercial sprint.com gateway will be blocked in the future.

NASA TELEMAIL users who wish to send messages to the Internet should use an alternative syntax which will route messages through the NASA gateway. For example, for direct addresses on the Internet, please use:

(site:smtppmail,ld:<Internet_ACCOUNT@Internet_HOST.DOMAIN>)

instead of

**(c:USA,a:TELEMAIL, p:INTERNET, "rfc-822":
<Internet_ACCOUNT(a)Internet_HOST.DOMAIN>)**

as described in the text. This note applies to all "rfc-822" addresses noted in the text.

Section IV.III, page 143:

Please note the SPAN_NIC service is no longer being maintained with current records. Users should use the newer NSINIC services now online.



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The interaction between the solar wind and the earth's magnetic field creates a large magnetic cavity which is termed the magnetosphere. Energy derived from the solar wind is ultimately dissipated by particle acceleration-precipitation and Joule heating in the magnetosphere-ionosphere. The rate of energy dissipation is highly variable, with peak levels during geomagnetic storms and substorms. The degree to which solar wind and magnetospheric conditions control the energy dissipation processes remains one of the major outstanding questions in magnetospheric physics. An AGU Chapman Conference on Solar Wind-Magnetospheric Coupling was convened by Y. Kamide and J. Slavin to discuss these issues on February 12-15, 1985 at the Jet Propulsion Laboratory in Pasadena, California (Artwork by K. Endo, ©Nikkei Science, Inc., Japan).

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Acknowledgements

IACG thanks the respondents from the various solar-terrestrial data centers for providing the information about their data systems. We also thank Robert McGuire, Glen Blair, Tamyé Lyles, and Len Blasso for their assistance in preparing the manuscript.

I Introduction

I. Introduction

This handbook of Solar-Terrestrial Data Systems has been prepared by the National Space Science Data Center in response to a request from the Inter-Agency Consultative Group. The primary purpose of this handbook is as a source of information to facilitate electronic access to and the exchange of solar-terrestrial data and metadata by the members of the international scientific community.

We need a handbook on Solar-Terrestrial Data Systems because:

- **A major problem facing researchers is determining what data exist or are planned that support their research efforts.**
- **Each satellite has its own organization that produces data sets.**
- **Data sets are released many months after the satellite is launched.**
- **Researchers must use personal contacts to find out what data are available.**
- **Researchers need to know what data systems are available to manipulate the data.**

The information presented here is derived from the responses to a questionnaire sent to the solar-terrestrial data systems as known to the NSSDC staff and the IACG Working Group-2, with follow-up contacts and verification of the information provided as possible. The questionnaire and the entries resulting in this handbook are intended to define the basic information needed for a user:

- **to assess the relevance of a given system to his/her requirements**
- **to enable an interested user to access a given system**
- **to identify points of contact where further information or other procedures required may be requested**
- **to summarize some high-level information about system architectures and available software components that may be useful to anyone designing or developing a new data system for solar-terrestrial science studies**

The handbook entries are intended to summarize the key characteristics of the various network-accessible solar-terrestrial data systems worldwide that are operating or under development. Specific points of information are to include:

- **a system's location, purpose, and status**
- **the name, address, and phone number of the person to contact for questions and additional system documentation**
- **access procedures**
- **the type of information and data available**
- **the system services provided**
- **the design or system architecture plus the public domain software availability**

An outline is provided in this section that gives the headings and the order of the information.

Questions about the form and content of this handbook as well as corrections or information about data systems not now referenced in the handbook should be addressed to:

**Dr. James L. Green
Head, National Space Science Data Center
Code 930.2
NASA/Goddard Space Flight Center
Greenbelt, MD 20771, USA**

**Telephone: (301) 286-7354
NSI/DECnet: NSSDCA::GREEN, NSSDCB::GREEN
Internet: green@nssdca.gsfc.nasa.gov
TELEMAIL: JLGREEN**

Outline for the Handbook of Solar-Terrestrial Data Systems

1. Data system identification

- a. Name of the data system
- b. Full name and address of the organization operating it, and of the agencies funding the operation and/or development of the data system
- c. Purpose of the operating organization (e.g., research areas sponsored)
- d. Purpose of the data system (user community and disciplines served)
- e. Current status (under development, operational, etc.)

2. System contact information

- a. Name, address (postal and electronic), and phone number for user support
- b. Name, address (postal and electronic), and phone number for person providing this information

3. Access procedures

- a. Description of how to reach the system online
- b. Primary network(s) for access
- c. List of terminal or graphics equipment supported
- d. Description of how to obtain an account, if needed, including any restrictions on who can use the system

4. System services provided

- a. Brief description/characterization of the kinds of information, and the types of data available (e.g., mission/instrument descriptions, data set catalogs, ST-relevant data sets, magnetic field or other models), including whether these are available online or offline
- b. Brief description/characterization of specific ST data sets available
- c. Brief description of online services, such as bulletin board, electronic conference, data processing/analysis (browse, data reduction and analysis, graphics, other)
- d. Brief description of procedures and services if facility is available for use by visiting scientists
- e. List of media available for data distribution (where media distributions are supported)

5. Ordering and pricing policy

Provide request procedure, cost information, and any data restrictions

6. Design and system architecture

- a. If possible and where appropriate, a brief overview of the system hardware/software architecture and brief descriptions or references noting the subsystems or software packages that compose the system.
- b. Brief description or identification with references of any specific data format(s) (e.g., a relational data base) on which the system is based.
- c. Brief note on the portability (proven or expected) of the system or any subsystems to other hardware/software environments.

7. Software available for distribution

- a. Brief description of each such software package, including the environment(s) in which it can be installed.
- b. Commercial products if and where required for use of each software package.

8. System references and documentation

A list of the appropriate documents and, if possible, an outline or description of the system.

9. Other Systems

Other systems related to the project, their purpose, and a contact for further information.

II. IACG Coordinated Missions

A. Early Phase: 1989-1991

CRRES

November 25, 1991

1. Data system identification

- a. Combined Release and Radiation Effects Satellite (CRRES)
- b. PL/GPD
Hanscom AFB, MA 01731
- c. Research
- d. The purpose of the CRRES data system is to provide CRRES researchers with Level-1 data in the form of agency tapes and GL researchers with access to the CRRES Time History Data Base (THDB) which contains science data from all CRRES sensors.
- e. The CRRES data system began operating in August 1990.

2. System contact information

- a. Mr. Allen R. Griffin
PL/GPD
Hanscom AFB, MA 01731 USA
Telephone: (617) 377-3711
- b. Mr. Dennis E. Delorey
Boston College
Institute for Space Research
Barry Pavillion
885 Centre Street
Newton, MA 02159 USA
Telephone: (617) 377-3753
NSI/DECnet: AFGL::DELOREY

3. Access procedures

There is no outside access to the CRRES data system at this time.

4. System services provided

- a. Agency tape data (Level-1) will be provided to PIs associated with the various sensor packages. There is no outside access to the CRRES Time History Data Base at this time.
- b. The Level-1 data provided to the PIs consists of time-tagged, raw telemetry along with associated attitude and ephemeris data.

5. Ordering and pricing policy

The ordering and pricing policy will be determined.

6. Design and system architecture

The CRRES data system for the generation of agency tapes and the CRRES THDB is CYBER/NOSVE hosted. The file structures are byte oriented within 32 bit positive integer words. Agency tape consists of raw telemetry along with magnetic field, attitude, and ephemeris. The THDB is generated from the agency tape data and consists of structured data sets on an instrument by instrument basis. Calibration files for each sensor are available to convert the THDB parameters to science units.

7. Software available for distribution

The CRRES data system software is not available to outside users.

8. System references and documentation

Griffin, Alan R., Dennis E. Delorey, and Robert E. McInerney. 1989. *CRRES Agency Tape Generation*, GL Technical Memorandum 174.

DE
SDDAS Data System

May 24, 1990

1. Data system identification

- a. Southwest Data Display and Archival System (SDDAS)
- b. Southwest Research Institute
Instrumentation and Space Research Institute
P.O. Drawer 28510
6220 Culebra Road
San Antonio, Texas 78228-0510
USA

NASA (software), SwRI (hardware)
- c. SwRI is a non-profit research organization performing research in the hard sciences. The Instrumentation and Space Research Division is dedicated primarily to Plasma Physics and Electronic Instrumentation as well as scientific hardware and software systems.
- d. The purpose of SDDAS is to allow space physics researchers easy access to the Dynamics Explorer 1 and 2 data sets for display and analysis. Presently, it is being upgraded to handle UARS PEM (Upper Atmospheric Research Satellite Particle Environment Monitor) data and the complete TSS-1 (Tethered Satellite System) mission data set.
- e. SDDAS is operating and continually improving.

2. System contact information

- a. Dr. J. David Winningham
Southwest Research Institute
Instrumentation and Space Research Institute
P.O. Drawer 28510
6220 Culebra Road
San Antonio, Texas 78228-0510
USA
Telephone: (512) 522-3075
NSI/DECnet: NSSDCA::CDHF1::PEM::DAVID
Internet: david@pemrac.space.swri.edu
- b. Karen Birkelbach
Southwest Research Institute
Instrumentation and Space Research Institute
P.O. Drawer 28510
6220 Culebra Road
San Antonio, Texas 78228-0510
USA
Telephone: (512) 522-5322
NSI/DECnet: SWRI::KAREN
Internet: karen@pemrac.space.swri.edu

3. Access procedures

a. To access the SDDAS through the NODIS system at the NSSDC:

- Select option 1 for Master Directory
- Select option 2 for Data System/Archive Descriptions
- Enter SDDAS for the archive acronym
- Enter LINK command to access SDDAS

For access directly via NSI/DECnet:

- At the "\$" prompt, enter SET HOST SWRI
- Logon with username SDDAS, no password.

For access via Internet (preferred access method):

- Issue the command: rlogin epsun.space.swri.edu-l sddas (there is no password).
For those hosts without a name server, the Internet address is 129.162.150.99.

For access via Internet (use only if you do not have rlogin):

- If your TELNET software supports alternate port numbers, enter: TELNET epsun.space.swri.edu 540
Port 540 accesses a special SDDAS TELNET server.
- If your TELNET client does not support alternate port numbers, enter: TELNET epsun.space.swri.edu
The username is "sddas."

Rlogin is preferred over TELNET because the latter protocol is deficient in handling flow control, and this may cause abnormalities in graphical output.

b. The primary networks for access are NSI/DECnet and Internet.

c. Selanar Hi-Rez, GraphOn Hi-Rez (Tektronix 4113, 256 colors), Modgraph (Tektronix 4113, 16 colors), Tektronix 4107, and X-windows

No account is needed to access SDDAS. Access instructions are given in section 3a.

4. System services provided

a. Data analysis and display of data from particle field and neutral instruments on board the Dynamics Explorer spacecraft. All data are located offline on optical disk, although no operator interaction is required to retrieve data. Data are automatically brought to magnetic disk when implicitly requested via a user program.

b. High Altitude DE-1 Data

Magnetometer	Vector magnetic field
Plasma wave instrument DE Electric fields	Electromagnetic waves Electrostatic waves
High altitude plasma instrument	Ion and electron fluxes to 30 keV

Low Altitude DE-2 Data

Magnetometer	Vector magnetic field
Vector electric field instrument	Vector electric field Variational electric field
Neutral atmosphere composition spectrometer	Neutral composition and density
Wind and temperature spectrometer	Vertical, zonal, and meridional components of neutral wind
Fabry-Perot interferometer	Drift and temperature of neutral and ionic atomic oxygen
Ion drift meter	Components of ion drift normal to spacecraft velocity
Retarding potential analyzer	Thermal ion density, temperature, irregularities; RAM component of ion drift
Langmuir probe	Electron temperature and density, ion density, irregularities
Low altitude plasma instrument	Ion and electron distributions to 30 keV; High energy monitors

c. Graphic display services (analysis programs)

- Spectrograms and Histograms
- Energy Angle
- Energy Spectra
- Wave Spectra
- Contours
- Moments Calculations
- Catalogue Services
- Data Export Services

d. There is space available for a limited number of visitors to do on-site data analysis at any given time. Visitors should notify the contact prior to arrival so that arrangements can be made for equipment availability. The staff can provide technical assistance to use the system.

- e. Magnetic tape at 1600 and 6250 bpl, DC 6150 .25-inch tape cartridge, 8mm helical scan tapes, and anonymous FTP via the Internet after using the export option. For large requests, the requestor must provide the media.

5. Ordering and pricing policy

To use a general user SDDAS account, there is no request, cost, or data restriction. It is public domain data. Normal DE rules of the road should be followed.

6. Design and system architecture

- a. Hardware:

SUN-4 330 computer system running SUN OS 4.0.3 (UNIX), 7 Optimem 1000 optical disk drives, 1 helical scan tape drive.

Software:

All SDDAS code is written in C.

- b. All data sets are stored in an SwRI developed paradigm called an Instrument Data File Set (IDFS). A future project will attach SFDUs to the data as well.

The data base, used to manage the data sets on the optical disks, was developed by SwRI specifically to support this system.

- c. Currently, SDDAS resides on a Sun Microsystems SPARCstation/330 and Convex C-1 supercomputer. It is presently being prepared for simple installation on other UNIX based machines. There are no plans to port SDDAS to other operating systems at this time. A few sites have agreed to serve as beta sites to test of the SDDAS package.

7. Software available for distribution

- a. This system must run on a platform running the UNIX operating system, either System V or BSD4.x derivatives. The complete SDDAS package can be (and has been) installed at remote sites. Data are retrieved automatically from the SwRI file server when needed at the remote site. An install procedure allows us to install the package from SwRI over the Internet.
- b. None.

8. System references and documentation

Data Display and Archival System, by Carrie Gonzalez, David Anderson, Stephanie Carpenter, and Sandee Jeffers is the complete user's guide and system description. It includes detailed examples of displays the system can produce.

EXOS-D
SIRIUS Data System

May 25, 1990

1. Data system identification

- a. Scientific Information Retrieval and Integrated Utilization System (SIRIUS)
- b. Data Handling Section
The Institute of Space and Astronautical Science (ISAS)
3-1-1, Yoshinodai, Sagamihara, Kanagawa 229, Japan
- c. The data handling section was established in ISAS in order to preserve the satellite telemetry data as well as the ephemeris data, which covers all the satellites launched by ISAS.
- d. The purpose of SIRIUS is to provide satellite telemetry and ephemeris data to the users.
- e. The data system is operating and continually evolving.

2. System contact information

Mr. Teruo Kato
The Institute of Space and Astronautical Science
3-1-1, Yoshinodai, Sagamihara, Kanagawa 229, Japan
+81-427-51-3911 ext. 2936

3. Access procedures

- a. The SIRIUS data base is constructed under the ISAS's main frame computer system (FACOM M-series). ISAS's main frame computer is linked with the inter-university network, the N-1 network. Through this network, users from the universities can gain online access. An account number is required to enter the ISAS's computer system. In addition to the N-1 network, access through the public telephone line is supported for a limited number of users.
- b. The primary network is the N-1 network, a domestic network that does not link to the international networks.
- c. G150, F6242, and others.
- d. At the present time, only the members of the EXOS-D science team have accounts.

4. System services provided

- a. The SIRIUS data base has mainly two types of data, ephemeris and satellite telemetry data.
- b. There is no specific data set.
- c. A user who has an account in ISAS's computer can use the browse facility and analyze the satellite data through the network.

- d. No special online services are available to the users outside the project. However, a data book, *Summary Plots*, will be sent to the scientists who are interested in collaborating with the EXOS-D science team after approval at an EXOS-D meeting.

5. Ordering and pricing policy

Before the EXOS-D science data are placed in the public domain, the use of the EXOS-D data is restricted to the project team.

6. Design and system architecture

- a. The SIRIUS data base is made under ISAS's computer systems (FACOM M-series), and controlled by the operation system (OS), MSP.
- b. There is a special format for SIRIUS data. It consists of frames; one frame consists of 144 bytes.
- c. Not portable.

7. Software available for distribution

Not available.

8. System references and documentation

Obara, T., et al. 1990. A New System for Operation and Data Handling of the Akebono (EXOS-D) Satellite, *Journal of Geomagnetism and Geoelectricity* 42:565-577.

Copies are available on request.

UARS

November 25, 1991

1. Data system identification

- a. Upper Atmosphere Research Satellite Central Data Handling Facility (UARS CDHF)
- b. UARS Project
Code 430
Goddard Space Flight Center
Greenbelt, MD 20771
USA
- c. The UARS Project is responsible for the design and implementation of the UARS that will carry out a systematic comprehensive study of the stratosphere and furnish important new data on the mesosphere and thermosphere.
- d. The UARS CDHF is the focal point for the collecting and scientific processing of the UARS data. It also ensures the UARS Science Team access to the data.
- e. The CDHF is currently under development.

2. System contact information

- a. Ellen L. Herring
UARS Project, Code 430
NASA Goddard Space Flight Center
Greenbelt, MD 20771
USA
Telephone: (301) 286-2228
NSI/DECnet: NSSDCA::CDHF1::EHERRING
Internet: NSSDCA.NSI/DECnet.NASA.GOV::CDHF1::EHERRING
GSFCMAIL: EHERRING
- b. Same as 2a.

3. Access procedures

- a. To access the UARS CDHF from a computer within the UARSnet, the user should enter the command SET HOST CDHF1 at the \$ prompt. Dial-in users can call (301) 286-9000 or (FTS) 888-9000. Enter UARS at the "enter number prompt." Access through both these procedures requires a valid account and a pre-defined password to sign on to the system.
- b. The UARSnet is primarily a DECnet supported network.

Under certain circumstances, transfer under a TCP/IP protocol is supported.
- c. All VTXXX terminals are supported and most CDHF capabilities can be supported through a wide range of other terminals.
- d. Accounts are limited to those individuals that have a well-defined role in the implementation of the UARS ground system and require access to the CDHF to support their activities. Contact the individual specified in section 2a.

4. System services provided

- a. Once operational, the UARS CDHF will contain scientific data collected during the UARS mission and complementary correlative data. All data will either be available online on magnetic or optical disk. An INGRES maintained catalog will track all data. Metadata objects will be maintained describing the format and contents of the higher level data sets.
- b. UARS test data sets are currently resident on the CDHF from instrument simulations and from the UARS thermal/vacuum test. During the mission atmospheric, solar, wind, and particle measurements taken during flight as well as correlative measurements (e.g., balloon flights, radiosonde data) that support the evaluation of the mission data will be maintained at the CDHF.
- c. Utilities are available on the CDHF that display the internal and external meeting schedules, preventive maintenance schedule, test data set availability, software availability, helpful hints, etc. A Forms Management System is on the CDHF to support problem reporting and tracking, system account requests, metadata object registration and access, etc. A menu system will be available to aid a user in locating data of interest and in transferring that data out of system managed space. Interactive orbit/attitude services will be supported via the CDHF menu system.
- d. Use of the facility by visiting non-UARS scientists is not specifically planned. Use of UARS data by non-Science Team personnel is addressed in the UARS Rules of the Road available from the Project Scientist, Carl Reber, Code 910, Goddard Space Flight Center, Greenbelt, MD 20771.
- e. Baseline mode of data transfer for the UARS mission is via electronic transfer over the UARSnet. Backup modes of data transfer include 6250 bpi magnetic tape, 8 mm cassette tapes, and 12 inch optical disk platter.

5. Ordering and pricing policy

UARS team members order UARS data sets via the menu system maintained on the CDHF. Data availability to the non-UARS scientific community is defined in the Rules of the Road described in 4d.

6. Design and system architecture

- a. The UARS CDHF is being implemented on a VAX cluster under the VMS operation system. The cluster will ultimately consist of a VAX 8800, a VAX 6440, a VAX 9410, and a VAX 9420. A FILETEK optical disk mass store jukebox system will be integrated into the CDHF. System software will provide a user interface to query the data catalog and access science data and will provide interface to the mass store. Some graphics capability is provided through IDL and NCAR software and mathematical packages such as IMSL and NAG are available.
- b. The UARS data catalog, query system, and many operations function are supported through the INGRES relational data base system. User interface with system software is provided through an interactive menu driven system developed for the Hubble Space Telescope Project. All menu functions are also available through a command interface.
- c. There were no portability requirements placed upon software developed for the CDHF and, in fact, much of the developed software takes advantage of VMS extensions on FORTRAN. There is no expectation that the system software will be ported to other environments.

7. Software available for distribution

- a. An orbit/attitude simulator and support software to assign/deassign and access data were provided to the instrument investigator software development teams to aid in implementing the data processing software. These software were developed to be run in a VMS environment. These software, slightly enhanced, will be re-delivered to be run post-mission at UARS investigator remote sites to aid in the data analysis process.
- b. None.

8. System references and documentation

UARS - A Program to Study Global Ozone Change (Brochure).

Upper Atmosphere Research Satellite (UARS) Mission, GSFC 430-1003-001, May 1985.

UARS Ground Data Processing Capability and Requirements Document, GSFC 430-1401-00, February 1985.

UARS Ground Data Processing Description Document, UARS Project, July 1989.

UARS CDHF Software System (UCSS) Programmer's Guide to Production Support Services, CSC/SD-86/6704/UD3, February 1990.

UARS CDHF User's Guide, CSC/SD-87/6725, February 1990.

UARS Programmer's Guide to Orbit and Attitude Services, February 1990.

ACTSDS

April 22, 1991

1. Data system identification

- a. ACTIVE Science Data System (ACTSDS)

The ACTIVE project is a magnetospheric system of two spacecraft.

- b. Space Research Institute USSR Academy of Sciences
Profsoyuznaya St., 84/32
117810, Moscow, USSR

INTERCOSMOS USSR Academy of Sciences funds ACTSDS.

Participating agencies/institutes are from Bulgaria, Hungary, Poland, Germany, Czechoslovakia, Rumania, and the USSR.

Brazil, Canada, Cuba, USA, Finland, and Japan take part in earthly observations.

- c. Space Research Institute USSR Academy of Sciences (IKI) is a non-profit research organization performing research in solar-terrestrial physics.
- d. The primary purpose of the ACTSDS is to ensure fast data acquisition, to perform Level-0 data processing and to distribute all the appropriate data to the ACTIVE scientific community.

2. System contact information

- a. V.D. Maslov
ACTIVE Project
Space Research Institute USSR Academy of Sciences
Profsoyuznaya St., 84/32
117810 Moscow GSP-7
USSR

Telephone: +7-095-230-25-85

FAX: +7-095-310-70-23

TELEX: 411498 STAR SU

- b. Same as 2a.

3. Access procedures

There is no outside online access to the ACTSDS at this time.

4. System services provided

- a. The ACTSDS receives spacecraft-related data (e.g., telemetry, orbit, attitude, command history) from two ACTIVE spacecraft, both scientific and operational. It also performs Level-0 data to create related instrument data sets and distributes this data to the scientific community.

b. Main Spacecraft

Plasma experiments:

Complex investigation of principal parameters of imperturbable ionosphere along orbit of satellite KM6

Dimension of ionic and neutral composition of plasma NAM-5

Complex of influence apparatus:

Wave influence of generator of low frequency ONCH-G

Influence of plasma complex:

Power charge of complex of influence apparatus AIP ZU

Waves apparatus:

VLF electromagnetic waves	1 Hz - 20*10 kHz	NVK-ONCH
VLF electromagnetic waves	1 Hz - 20*10 kHz	ONCH-2
VLF electromagnetic waves	1 Hz - 20*10 kHz	SHASH
VLF electromagnetic waves	0.7 Hz - 10*10 mHz	PRS-2

Dimension of impedance of magnetic antenna:

VLF electromagnetic waves	9 kHz - 11 kHz	BIM-A
VLF electromagnetic waves	1.5 kHz - 19.5 kHz	BII

Electron and proton distribution, Ee=18 - 400 keV, Ep=15 - 800 keV SPE

Magnetic experiments:

Magnetometer (3 components) +60000 nT (resolution 1 nT), DC to 10 Hz MAG

Subsatellite:

Equipment for measurements of electric and magnetic fields, VLF waves, plasma and energetic particles C2-AK

The auxiliary information is available on the spacecraft location (Solar Ecliptic, Solar Magnetic, coordinate system, interspacecraft separation, local time) for every 1-3 hours.

The final list of these parameters may slightly be changed.

c. Not available at this time.

d. No special online services are made to the users outside the project.

e. Magnetic tape at 800, 1600, and 6250 bpi 0.5-inch magnetic tapes; IBM PC/AT 5.25 inch floppy diskettes.

5. Ordering and pricing policy

Usage of the ACTIVE data will be restricted to the project team a few years after acquisition.

6. Design and system architecture

- a. The ACTSDS runs on a mainframe compatible with the IBM 370 and net PC/AT. PL/1 and TURBO PASCAL languages are used.
- b. There are the special formats of ACTIVE data. They consist of frames; one frame consists of 270 bytes.
- c. Not portable.

7. Software available for distribution

Not available.

B. Middle Phase: 1992-1994

**GEOTAIL
SIRIUS Data System**

May 25, 1990

1. Data system identification

- a. Scientific Information Retrieval and Integrated Utilization System (SIRIUS)
- b. Data Handling Section
The Institute of Space and Astronautical Science (ISAS)
3-1-1, Yoshinodai, Sagamihara, Kanagawa 229, Japan
- c. ISAS established the data handling section to preserve the satellite telemetry data and ephemeris data, which covers all the satellites that ISAS launches.
- d. The purpose of SIRIUS is to provide the satellite telemetry data and ephemeris data to the users.
- e. Not yet running for GEOTAIL.

2. System contact information

Mr. Teruo Kato
The Institute of Space and Astronautical Science
3-1-1, Yoshinodai, Sagamihara, Kanagawa 229, Japan
+81-427-51-3911 ext. 2936

3. Access procedures

- a. The SIRIUS data base is constructed under the ISAS's main frame computer system (FACOM M-series). ISAS's main frame computer is linked with the inter-university network, the N-1 network. Through this network, users from the universities can gain online access. An account number is needed to enter the ISAS's computer system. Another network to run the TCP/IP protocol, allowing easier access to the SIRIUS data base, is planned.
- b. The primary network is the N-1 network, which is a domestic network and does not link internationally. A TCP/IP network is planned.
- c. At this time, terminals such as G150, F6242 which are made by FACOM are used. In the future, M-series computers will support the TCP/IP protocol; some Unix work stations will be used as terminals.
- d. Only the members of the GEOTAIL project team will have accounts.

4. System services provided

- a. The SIRIUS data base has mainly two types of data: ephemeris and satellite telemetry data. Users can look at the list of the data acquisition and access a large amount of digital data.
- b. There is no specific data set.
- c. A user who has an account in ISAS's computer can use the browse facility and analyze the satellite data through the network.

d. No special online services are available to the users outside the project.

5. Ordering and pricing policy

Use of the GEOTAIL data will be restricted to the project team. However a few years after acquisition, the GEOTAIL science data will be placed in the public domain.

6. Design and system architecture

- a. The SIRIUS data base system is made under the ISAS's computer systems (FACOM M-series), and is controlled by the operation system (OS) named MSP.
- b. There is a special format for SIRIUS data. It consists of frames; one frame consists of 144 bytes.
- c. Presently, SIRIUS is not ported.

7. Software available for distribution

Software to analyze the satellite data will belong to each PI's group. There will be no public software package.

8. System references and documentation

None.

9. Other systems

It is also planned to create a data base consisting of the processed data (calibrated data). Details of this data base are being defined.

ISTP GGS Data System

June 4, 1990

1. Data system identification

- a. International Solar-Terrestrial Physics (ISTP) Program Central Data Handling Facility (CDHF) and Data Distribution Facility (DDF)
- b. Information Processing Division (IPD)
Code 560
NASA Goddard Space Flight Center (GSFC)
Greenbelt, MD 20771
USA

IPD is funded by NASA
- c. The IPD is part of the Mission Operations and Data Systems Directorate at GSFC and facilitates on behalf of the ISTP Project the acquisition, development/upgrade, and subsequent maintenance and operations of the CDHF and DDF.
- d. The primary purposes of the CDHF are:
 - to support the major data processing requirements of the GEOTAIL, WIND, POLAR, and SOHO spacecraft as far as performing Level-0 data processing, generating key parameter data sets for the principal investigators (PIs), and distributing all the appropriate data to the ISTP scientific community in a timely and accurate manner.
 - to provide a central repository for key parameter data and related instrument data sets that can be electronically accessed and shared by the ISTP scientific community for the lifetime of the ISTP program.

The purpose of the DDF is to organize and distribute the products of the CDHF to the NSSDC, Japanese Institute of Space and Astronautical Science (ISAS), and the PIs/Co-Is.

- e. The CDHF and DDF are currently under development.

2. System contact information

- a. System contact information will be determined.
- b. Richard Schneider
ISTP Project, Code 407
NASA Goddard Space Flight Center
Greenbelt, MD 20771
USA
Telephone: (301) 286-5543
NSI/DECnet: NSSDCA::SCHNEIDER

3. Access procedures

- a. How to reach the system online will be determined.
- b. The primary network for CDHF access is NSI/DECnet; DDF is not available online to users.
- c. 320 Monochromatic Video Terminals on the CDHF
VAXstation 3100 Graphics Workstations (Diskless) on the DDF

No terminal/graphics equipment supported.
- d. How to obtain account and any restrictions will be determined.

4. System services provided

- a. The CDHF system is to serve both as a pipeline for transferring ISTP satellite-related data and as a processing facility to generate key parameter data. The CDHF receives spacecraft-related data (e.g., telemetry, orbit, attitude, command history) from various disjoint components of the ISTP community, both scientific and operational, and transfers this data to the DDF for distribution to the scientific community. In addition to pipelining, the CDHF will process Level-0 data to create a major data product—the key parameters.

The science instrument data for each experiment on the ISTP satellites is to be evaluated within the CDHF with software provided by the PIs. The key parameters will provide a means of quick analysis for both instrument performance and geospace phenomena. The parameters, specifically chosen for each experiment, are produced by sampling and processing the telemetry data. The key parameters will be stored online at the CDHF for 90 days. The data available for online access at the CDHF will include the Level-0 data, orbit data, attitude data, key parameter data, command history data, and data attribute information. The data received by the CDHF will be cataloged, stored, and verified. The goal is to have this data available within four hours of when it is received. The goal for the generated data (key parameter data) is to have it ready for online access within six hours of cataloging.

The DDF will organize, write to distribution media (e.g., optical disk), and distribute the products of the CDHF to the NSSDC, ISAS, and science investigators.

- b. See section 4a for a general description of data sets available on the CDHF and DDF.
- c. The interactive interface will provide display management and interface management capabilities needed to support online interactive input and output with the users of the CDHF system. The interactive interface provides the CDHF with window management capabilities to aid in data transfer, data receipt and initiating, and monitoring and controlling the data processing function.

The interactive interface will provide the link between the remote users on the NSI/DECnet network and the CDHF functions that support the remote users. The presentation menus and data entry panels will provide an intelligent interface to the CDHF. The interactive interface will control the menus and entry panels and provide the user with access to the CDHF online data.

The CDHF will support electronic mail internally and over the NSI/DECnet network. Users may send mail to the CDHF and will have a mailbox on the CDHF for receiving mail. Mail is to be used by the CDHF operations staff to make certain announcements. The CDHF will also support an electronic bulletin board, which will contain messages and announcements of general interest.

The DDF interactive mode is under the complete control of the DDF support personnel and is not available to users.

- d. The services of the CDHF will be available to visiting scientists from all countries. The description of the procedures and services will be determined.
- e. The data will temporarily reside at the CDHF and will be available online for a limited time. The data will be subsequently transferred electronically to the DDF and distributed on hardcopy media to the science community. The DDF media available will be nine-track magnetic tape and a form of optical disk.

5. Ordering and pricing policy

- a. A user of the CDHF system will be able to transfer online data from the CDHF to a Remote Data Analysis Facility (RDAF). Normally, only online data may be requested. When the data are not online in the CDHF, the CDHF will be capable of retrieving it from the DDF. The user will enter the selection information to specify the data to be transferred and may request that the transfer occur immediately or be scheduled to occur at a future time. The user may also request that a standing transfer request be established. A standing transfer request is a request for a data transfer that is always active. For instance, a user may request that a portion of the latest Level-0 data be transferred daily to his/her RDAF.

Transferring data from the CDHF to the RDAFs will be subject to two conditions: the user's access rights to the data and the user's line usage quota. If a user does not have access rights to a particular set of data, he/she will not be able to access that data. Line usage quotas are established to control the amount of data that a user can request for a particular time period. If a user requests a data transfer that exceeds his/her quota, the transfer will not take place.

A user will be able to transfer data from a remote site to the CDHF. These transfers will typically be updates to key parameter software or ground-based key parameter files.

- b. Level-0 and key parameter (all organized by spacecraft instrument), command history, orbit, and attitude data (organized by spacecraft) will be written to the distribution media for distribution to PIs/Co-Is. Each PI/Co-I will receive a set of orbit and attitude data, all key parameters, and the Level-0 data for the experiment for which he or she is responsible. The frequency of distribution (the mailing cycle) and the amount of data distributed are variable and dependent on the instrument.

Distribution of data from the DDF will be supported in four different ways: normal distribution, redistribution, forced distribution, and ad hoc distribution.

Normal distribution of data for a specified time period and a specified requester will be initiated by DDF personnel when all of the required files have been received by the DDF. The files will be written to the distribution media on the write cycle, and the media will be mailed to the requester during the distribution write cycle.

Whenever distributed data is unreadable at the PI's RDAF or is not received, the PI/Co-I may request redistribution from the DDF. The DDF personnel will retrieve the appropriate files from storage, create a copy of the original data, and redistribute the data on hard media. A PI/Co-I may request redistribution at any time.

Forced distribution will be necessary whenever an incomplete set of data is to be distributed. For example, if two days of data are required immediately and normally six days of data are distributed, the operator can initiate the forced distribution and mailing of the two days of data. The next normal distribution of data will then occur at

the expiration of the normal interval. The data will consist of the normal distribution data for the writing and mailing cycles.

Occasionally a PI/Co-I may need a file that he or she would not generally receive via normal distribution. The ad hoc distribution function will allow the PI/Co-I to request and obtain additional data.

All data requested and approved is delivered to the NSSDC as well as to the investigators, although the schedule may differ. All GEOTAIL data are distributed to ISAS and the investigators.

6. Design and system architecture

The design and system architecture will be determined.

7. Software available for distribution

Software distribution will be determined.

8. System references and documentation

ISTP CDHF System Requirements Specification, Revision 1. April 1990, GSFC.

Hardware and System Level Software Functional and Performance Specification for the ISTP CDHF GSFC. March 1990.

ISTP CDHF Operations Concept, Revision 1. May 1990.

System Requirements Specification for Data Distribution Facility (DDF) Support of the International Solar-Terrestrial Physics (ISTP) Program. January 1990.

Operations Concept for Data Distribution Facility (DDF) Support to the International Solar-Terrestrial Physics (ISTP) Program. January 1990.

This documentation will be available in the ISTP library after July 1990.

INTSDS

November 25, 1991

1. Data system identification

a. INTERBALL Science Data System (INTSDS)

The INTERBALL project is a magnetospheric system of four spacecraft. Two of the satellite spacecraft system of the Prognoz series is used (Tail probe and Auroral probe); each of the spacecraft is supplied by the subsatellite (Tail C2-X and Auroral C2-A).

b. Space Research Institute USSR Academy of Sciences Profsoyuznaya St., 84/32 117810, Moscow, USSR

INTSDS is funded by INTERCOSMOS USSR Academy of Sciences.

Participating agencies/institutes are from Austria, Bulgaria, Canada, Cuba, Czechoslovakia, France (CNES), Netherlands (ESA/ESTEC), Italy, Poland, Sweden, and the USSR.

c. Space Research Institute USSR Academy of Sciences (IKI) is a non-profit research organization performing research in solar-terrestrial physics.

d. The primary purposes of the INTSDS are:

- to ensure fast data acquisition, performing Level-0 data processing, generating key physical parameter data sets and distributing all the appropriate data to the INTERBALL scientific community.
- to provide a central repository for key physical parameter data and related instrument data sets.

e. The INTSDS is under development. The expected operating date is the second part of 1992.

2. System contact information

a. Elena A. Gavrilova INTERBALL Project Space Research Institute USSR Academy of Sciences Profsoyuznaya St., 84/32 117810, Moscow, USSR

Telephone: +7-095-230-25-85

FAX: +7-095-310-70-23

TELEX: 411498 STAR SU

b. Same as 2a.

3. Access procedures

At present there are no online capabilities available.

4. System services provided

- a. The INTSDS will receive spacecraft-related data (e.g., telemetry, orbit, attitude, command history) from four INTERBALL spacecrafts, both scientific and operational. It will perform Level-0 data to create the key parameters and related instrument data sets, and distribute this data to the scientific community.

- b. Auroral Probe:

Auroral plasma experiments

Electron and proton distribution, $E=0.03-15$ keV; Electron and ion anisotropy, ($M=1,4,16$), $E=30-500$ keV/Q	SKA-3
Ion spectra and anisotropy, ($M=1,2,4,16$), $E=0.005-20$ keV/Q	ION
Electron and proton spectrometer, $E=0.02-25$ keV;	ANEPE-2
Ion composition, ($M=1-32$), $E < 100$ keV/Q	PROMICS-3
Magnetic, electric fields, and wave experiments	
Magnetometer (3 components) +60000 nT (resolution 1 nT), DC to 10 Hz	IMAP-3 DC
Electric field intensity 0-50 Hz	IESP-2
VLF electromagnetic waves 20 Hz - 20 kHz	NVK-ONCH
Analyzer of magnetic waves < 20 MHz	MEMO
Auroral kilometrical radio radiation 20 kHz-2 MHz	POLRAD

Thermal plasma experiments

Ion mass-analyzer, $E=0-100$ eV, $V=0.1-20$ km/s, (H^+ , He^+ , O^+ , O^{++} , N^+ , N^{2+} , NO^+ , O^{2+})	HYPERBOLOID
Temperature of cold plasma electrons, $T < 10$ eV	KM-7
Ion trap, $N > 1$ cm ⁻³ , $E < 25$ eV	AP-3
Ion emitter (N^{2+} , In^+), current 1-10 mA	RON

Energetic particles experiments

Electron and proton anisotropy, $E_e=10-400$ keV, $E_p=15-1000$ keV	DOK-2A
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Auroral oval image

Emission measurement in the lines 1304Å, 1356Å, 1493Å	UFSIPS
UV Auroral imager (1400Å-1600Å)	UVAI

Subsatellite

Equipment for measurements of electric and magnetic fields, VLF waves, plasma and energetic particles C2-A

Tail Probe:

Plasma experiments

3D ion distribution, $E=0.1-5$ keV/Q
Energy spectrum of H⁺, He⁺⁺, He⁺, O⁺; $E=5-100$ keV SKA-1

3D sectorial ion Faraday cup, $E_i > 0$ eV VDP

3D electron distribution function, $E=0.01-30$ keV ELECTRON

Wide-range 3D ion spectrometer, $E=0.1-30$ keV/Q CORALL

Energy-mass analyzer, ($M=1-16$), $E=0.1-10$ keV/Q AMEI-2

Solar wind analyzer, $E=0.4-15$ keV/Q MONITOR-3

Ion composition 3D spectrometer, $E=1$ eV/Q-100 keV/Q PROMIX-3

Thermal plasma experiment

Ion trap, $N > 1$ cm⁻³, $E < 25$ eV/Q AP-3

Energetic particles and X-ray experiments

Low and energetic charged particle composition and anisotropy, $E_e=40-200$ keV, $E_i=50$ keV-150 MeV SKA-2

Electron and proton fluxes and anisotropy, $E_e=10-400$ keV, $E_p=15-1000$ keV DOK-2X

Solar X-ray, $E=2-200$ keV RF-15

Wave complex ASPI

Measurements of electric field in frequency range 0 - 250 kHz OPERA

Measurements of magnetic field in frequency range 0 - 40 kHz MIF-M

Measurements of ion flux and electron flux fluctuations in frequency range 0.1 - 1000 Hz IFPE

Multichannel spectrum analyzer in frequency range 0.25 Hz - 40 kHz and measurement of current density in frequency range 0.1 Hz - 40 kHz ADS

Adaptive processing of wave information and X-ray information PRAM

Magnetometer ± 200 nT (resolution ± 0.05 nT) IMAP-2

Kilometric radio emission 100 kHz - 1.5 MHz

AKR-2

Subsatellite

Equipment for measurements of electric and magnetic fields, waves, plasma and energetic particles

C2-X

A suggested list of the key physical parameters includes ion bulk velocity, ion temperature, ion flux, ion flow polar and azimuth angles, electron temperature, electron density, average energy of O⁺ ions, electrons flux, components of magnetic field, module magnetic field, electric and magnetic field fluctuations, spacecraft potential for every two minutes, and some auroral oval images.

The auxiliary information will be available on the spacecraft location (Solar Ecliptic, Solar Magnetic, coordinate system, interspacecraft separation, local time) for every 1-3 hours.

The final list of these parameters may be slightly changed.

- c. Not available at this time.
- d. No special online services are available to the users outside the project.
- e. Magnetic tape at 800, 1600, and 6250 bpi 0.5 inch magnetic tapes; IBM PC/AT 5.25 inch floppy diskettes

5. Ordering and pricing policy

Use of the INTERBALL data will be restricted to the project team for a few years after acquisition.

6. Design and system architecture

- a. The INTSDS will be run on mainframe compatible with an IBM 370 and net of PC/ATs. PL/1 and TURBO PASCAL languages are used.
- b. There are special formats of INTERBALL data. They consist of frames; one frame consists of 128 or 512 bytes.
- c. Not portable.

7. Software available for distribution

Not available.

8. System references and documentation

Gavrilova, E. A., G. N. Zastenker, R. A. Kovrazhkin, et al. 1990. *Brief Description of INTERBALL Project Data Support System.*

C. Late Phase: 1995-1997

CSDS

November 25, 1991

1. Data system identification

a. Cluster Science Data System (CSDS)

The provision of the European Cluster Science Data System is currently in the implementation stage following an Announcement of Opportunity by ESA. The responses were evaluated in a competitive manner. The most up-to-date information on the CSDS can be found in the final report of the Cluster Science Data System Working Group and the CSDS Announcement of Opportunity. Both documents describe in detail the concept that is quite close to the current implementation plans. All information given below is based on this report.

b. The CSDS will be distributed in Europe and electronically linked by ESA's backbone network. Major national institutions as well as university institutes are expected to play an active role.

Participating institutes/institutions will be from France, Germany, Scandinavia, United Kingdom, and Austria. Institutes in Hungary and China have expressed interest in participating. NSSDC could become the interface point for the U. S. Cluster community.

c. CSDS will primarily serve the Cluster community to ensure fast scientific data analysis by coordinating and optimizing the dedicated resources in the individual ESA member states.

d. The user community will primarily be the Cluster Science Team comprising all principal and co-investigators. It is also planned to make low-resolution data (SPDB plots [Section 4]) available to outside communities.

2. System Contact Point

R. Schmidt
Cluster Project Scientist
Space Science Department of ESA
Keplerlaan 1
NL-2200 AG Noordwijk
The Netherlands
Tel: (0)1719-83603
NSI/DECnet: ESTCS1::RSCHMIDT

3. Access procedures

- a. It is planned to use the European Space Information System (ESIS) as an access tool for the users. Depending on the privileges, users may be allocated restricted/unrestricted access to CSDS.
- b. See 3a.
- c. The list of terminal or graphics equipment supported is being determined.
- d. Authorization to access and retrieve data will be granted based on recommendations by the Cluster Science Working Team.

4. System services provided (concept)

Summary Parameter Data Base (SPDB) and SPDB Plots:

The 1-minute averaged Summary Parameters form the basis of the Summary Plots to be routinely produced. The Summary Parameters contain only data from one out of the four Cluster spacecraft. A suggested list of possible parameters is given below. However, the final list may be much shorter.

Magnetic Field (FGM)

Four panels containing:

- Magnetic field amplitude
- Magnetic field azimuth angle
- Magnetic field elevation angle
- Modulus of magnetic field ($\Delta B/B$)

Electric Field (EDI)

Three panels containing:

- Electric field amplitude
- Electric field azimuth
- Electric field elevation angle

Electric Field (EFW)

Three panels containing the same as EDI with the same ordinate ranges, plus two additional panels with density fluctuations and spacecraft potential:

- Electric field X-component
- Electric field Y-component
- Density fluctuations
- Spacecraft potential

Wave Experiment Data (WEC)

- Total electron density (from WHISPER sounder)
- 0.1-10 Hz, E and B power (from Wave Form)
- 10-170 Hz, E and B power (from Wave Form in high bit and Spectral Analyzer in low bit rate)
- 0.17-4 kHz, E and B power (from Spectral Analyzer)
- 4-80 kHz, electric power (from WHISPER)

Electron Plasma Data (PEACE)

- Electron density
- Electron bulk speed
- Electron temperature
- Electron heat flux

Ion Plasma Data (CIS)

Proton and oxygen density
He⁺⁺ and He⁺ density
Proton and oxygen bulk speed
Proton and oxygen bulk flow azimuth
Proton and oxygen bulk flow elevation
Proton and oxygen temperature

Energetic Ions (RAPID)

Electron intensity, anisotropy, spectral index
Proton intensity, anisotropy, spectral index
Helium intensity, anisotropy, spectral index
M > 4 ions intensity, anisotropy, spectral index

Differences of proton intensities as follows:

$$\frac{I_N - I_1}{I_N + I_1}$$

Ion Current (Instrument ASPOC)

4-s/c Separation and s/c Velocity

Three panels containing the GSE X, Y, Z vector position of spacecraft 2-4, relative to s/c 1, in km. An additional panel may contain the velocity (magnitude) of s/c 1.

ΔX_{2-1} , ΔX_{3-1} , ΔX_{4-1}
 ΔY_{2-1} , ΔY_{3-1} , ΔY_{4-1}
 ΔZ_{2-1} , ΔZ_{3-1} , ΔZ_{4-1}
velocity of s/c 1

4-s/c Parameter Differences

ΔB_{2-1} , ΔB_{3-1} , ΔB_{4-1}
 ΔN_{2-1} , ΔN_{3-1} , ΔN_{4-1}
 ΔV_{2-1} , ΔV_{3-1} , ΔV_{4-1}

or

ΔT_{2-1} , ΔT_{3-1} , ΔT_{4-1}

(Each of these differences are to be normalized to the sum; thus ΔB_{2-1} means $\frac{B_2 - B_1}{B_2 + B_1}$.

In this way, the numbers are in the range -1.0 to +1.0)

Auxiliary Information

Information on the GSE spacecraft location.
Local time (in hh:mm), and latitude (in Deg) for every full hour.

Prime Parameter Data Base (PPDB)

The PPDB will be the main data base for the CST. It will include spin averages of at least the 60 physical parameters contained in the SPDB (preliminary or calibration and in physical units), but for each of the four spacecraft. Additionally, there should be full information on spacecraft location, interspacecraft separation, and other auxiliary data.

This data base should be accessible by the whole CST, but not normally by the outside world (using these data in publications must be discussed with the respective PIs). It will be the basis for most of the correlative studies and fulfill any needs arising from cross-calibration between different Cluster experiments. The data base will contain about 3,000,000 data points per 12-hour pass and thus, about 10 GB for the two-year mission (assuming four bytes per data point). The distribution of these data to the CST will take place either by Raw Data Processing or by access to the DCs.

Online services and access to CSDS:

ESIS Communication Services

ESIS Communication Services will include a number of functions that are designed to simplify the exchange of information among users, starting from standard network applications (e.g., electronic mail, data, software and documentation transfer, remote login, white and yellow pages directory services). Value added functions (e.g., electronic bulletin boards, electronic newsletters, electronic conferencing systems, etc.) will be included also.

The communication services, based on the transport services primarily provided by ESANET will also allow communication with users of other networks, in particular the European Research Academic Network (EARN), the Joint Academic Network (JANET) in the UK, and the NASA Science Internet (NSI) in the USA.

Electronic Conferencing

An electronic conference is effectively the use of a collective mail account by registered members. Any registered member can submit mail to the conference, and the conference mail can be read by any other member of the conference. To avoid disorder, a moderator, is nominated to manage the electronic mail (in particular, he/she can delete irrelevant correspondence). Even with a satellite-commanding electronic conference, it is the PI (or his nominated representative) who ultimately decides what commands should be sent to his experiment.

STSP Satellite Situation Center

It is proposed that a Satellite Situation Center (SSC) be established to provide up-to-date and predicted information on Cluster and Regatta, and possibly other related missions. The center would provide online information on satellite orbits and their relation to the current magnetospheric environment (e.g., bow shock and magnetopause) for the PI's operations planning. For Cluster, specific attention should be paid to the position and separation of the four spacecraft and this information will be based on data contained within the SHF.

Each DC should establish network access and provide adequate hardware to make full use of this facility (e.g., via ESIS).

Scientific Data Long-Term Archive

The concept of a remotely accessible archive that holds, among other data sets, all routinely produced scientific and auxiliary mission products may be implemented. The lifetime of the archive should clearly exceed the lifetime of the mission operations.

5. Ordering and pricing policy

The pricing and ordering policy will be determined.

6. Design and System architecture

The design and system architecture will be determined.

7. Software available for distribution

Software distribution will be determined.

8. System References and documentation

The design of CSDS is described in detail in the *Cluster Science Data System: Final Report of the Working Group*. This report can be obtained from the address identified in section 2.

SOHO

August 23, 1990

1. Data system identification

- a. SOHO Data System (Solar and Heliospheric Observatory)
 - b. ESA/ESTEC
Science Directorate
2200AG Noordwijk
The Netherlands
- and
- NASA
Goddard Space Flight Center
Greenbelt, MD 20771, USA
- c. Space Science Research
 - d. The purpose of the SOHO data system is to ensure maximum return for the scientific community of the data produced by the SOHO spacecraft by:
 - providing a facility to operate the imaging instruments of SOHO in real-time in a sort of observatory mode.
 - providing the infrastructure necessary (data bases, electronic links, etc.) to coordinate the operation of the SOHO investigations among themselves and with other ground and space observatories.
 - providing the necessary infrastructure for data analysis by the SOHO investigators, guest investigators, and the scientific community at large.
 - e. Under development (definition phase). The definition phase will be completed in 1991. SOHO's launch is currently planned for July 1995.

2. System contact information

- a. Vicente Domingo
Space Science Department
Postbus 299
2200AG Noordwijk
The Netherlands
BITNET: vdomingo@estec, span estcs1::vdomingo

or

Art Poland
Code 682.1
GSFC
Greenbelt, MD 20771
USA
NSI/DECnet: pal::poland

- b. **Vicente Domingo**
Space Science Department
Postbus 299
2200AG Noordwijk
The Netherlands
BITNET: vdomingo@estec, span estcs1::vdomingo

3. Access procedures

Access procedures will be determined.

4. System services provided

a. Data sets:

i. Science, Housekeeping, and Auxiliary Data

SOHO investigations telemetry data and spacecraft ancillary data.

ii. Processed Science Data

Data files of the scientific data in a form ready for analysis, or the suitable software will be created by each PI, either at the Experiment Operations Facility (EOF) or at their institute.

iii. Summary Data

A summary data file (equivalent to the key parameters file in other spacecraft) will be generated with inputs from the PIs containing: a limited number of solar images per day (at selected wavelengths), synoptic information from selected channels (particles, radiometers etc.), information on the observed areas, events and operating modes of the coronal instruments (with limited area scanning), etc.

iv. Event Time File

A time-unique data file will be generated and kept up to date, electronically reachable, where each investigation team will register the events that may be relevant to more than one instrument. It will also contain events registered by observatories external to SOHO that may be relevant to the SOHO observations.

b. Data set descriptions:

i. Data Sets Dissemination and Archiving

The data products of SOHO (Level-0 science data, housekeeping data, auxiliary data and processed data) will be archived for a minimum of 10 years. Although the NSSDC has been shown as the long-term data archive facility, other options are being studied by GSFC for long-term SOHO data archival. One option would be to use the Solar Activity Research Center (now being assembled with the Solar Maximum Mission data as the core), which may provide potential support for SOHO.

ii. Science, Housekeeping, and Auxiliary Data

NASA will mail a hard copy of respective science, housekeeping, and auxiliary data to each PI within three weeks of when it is received at GSFC. The PI is then responsible to further distribute such data to any Co-Is or support institutions. In

addition, telemetry data will be available in the form of "snapshots" for limited call up to approved participating organizations. These data, available electronically from the CDHF, would represent the most recent eight days of information.

iii. Processed Science Data

A number of SOHO institutes (PIs and others) will hold archives of the science and processed science data corresponding to the experiment of their responsibility. The development of a central archiving facility (NSSDC, EOF) for processed data is being determined. The EOF will hold archives of processed data to some extent.

iv. Summary Data and Event Time Files

The EOF will hold an online copy of the summary data and event time files.

c. Data Catalogs

All the participating SOHO data archives will maintain data catalogs of their own files according to standards agreed by the SOHO SWT. The catalogs will be accessible electronically, according to agreed protocols. Whether it is convenient to develop a centralized SOHO data catalog or not is being determined. New network techniques are being introduced that could cope with a distributed catalog if its adoption is agreed (ESIS in Europe, unknown in the USA). The Summary Data Set and the Event Time File will be online data files at the EOF with copies at the NSSDC and at the ESA/ESTEC.

d. Data format and data access will be determined.

5. Ordering and pricing policy

Not Applicable.

6. Design and system architecture

a. The following is a list of the main facilities that form part of the SOHO data system from the scientific data analysis point of view. More appropriate details will be available in 1991.

1. Experiment Operations Facility (EOF):

- provides the means with which the PI teams participating in the SOHO program can monitor and, via the SOHO Payload Operations Control Center, control their instruments on-board the spacecraft.
- is the center where the SOHO solar atmosphere investigators will coordinate and plan the real-time operation of their instruments, and will be the focal point for the overall SOHO science operations planning and for coordinating science studies through campaigns and workshops.
- provides electronic interfaces with the appropriate data bases and networks to support the WS's activities and to provide the necessary input from ground stations and other spacecraft data for the planning of the SOHO science operations.

ii. **Central Data Handling Facility (CDHF):**

- is an element in the SOHO Ground Segment, providing a short-term archive for Level-0 data, command history data, and definitive predicted orbit and attitude data.
- provides an online repository for file access by the EOF workstations and remote SOHO PI institutes to perform higher order data processing.

iii. **National Space Data Center (NSSDC):**

Will, in principle, provide the long term archiving of the complete set of SOHO data products (with the exception of the SOI/MDI helioseismology data).

iv. **Principal Investigator and Co-Investigator Institutes:**

Some of the institutes of the SOHO principal investigators and co-investigators will process and keep archives of the processed and unprocessed data.

v. **MDI/SOI Data Reduction and Analysis Center:**

The MDI/SOI investigation will create a Data Reduction and Analysis Center (DRAC) at Stanford University, specifically for the helioseismology data.

vi. **European Extension of the EOF (EEEEOF):**

A European Extension of the Experiment Operations Facility (EEEEOF) may be provided at a location by a European Institution, following an Announcement of Opportunity. The EEEEEOF will repeat in Europe the facilities available at the EOF. If operated simultaneously, the EEEEEOF will be subsidiary to the EOF. The interaction between the EOF and the EEEEEOF will be defined at a later stage, coordinating with the SOHO SWT. Possible ways of operating are:

- at different hours (during the two months of continuous real-time operation per year)
- by campaigns
- in parallel, but coordinated

7. Software available for distribution

Software distribution will be determined.

8. System references and documentation

The documentation for the different components of the SOHO Data System is being completed; the first versions will be available during 1991.

III. Data Systems, Information Services, and National/ International Archive Centers

DMSP Auroral Oval Data Base

November 25, 1991

1. Data system identification

- a. DMSP Auroral Oval Position, Structure, and Fluxes
- b. Operated by the Johns Hopkins University Applied Physics Laboratory.

Funded by grants from the Air Force Office of Scientific Research and the National Science Foundation.
- c. JHU/APL is a non-profit, government-sponsored, university-owned research laboratory.
- d. The data system is intended to serve those members of the solar-terrestrial relations community who study magnetospheric phenomena; particularly to aid low altitude and ground-based researchers.
- e. The data base is operating for DMSP F7 and F9 satellites (pre-noon to pre-midnight) and under development for DMSP F6 and F8 (in dawn/dusk meridians).

2. System contact information

- a. Patrick T. Newell
The Johns Hopkins University Applied Physics Laboratory
Johns Hopkins Rd.
Laurel, MD 20723
USA
(301) 953-5000 x8402
APLSP::NEWELL
- b. Same as 2a.

3. Access procedures

- a. Refer to Newell et al., *Journal of Geophysical Research*, 1990 for further details. Data are requested by sending a rigidly formatted NSI/DECnet message to APLSP::OVAL; requests are automatically processed three times daily. The subject of the message must be:

DATA_REQUEST. Format
Starting; 19xx.mm.dd.hh
Ending; 19xx.mm.dd.hh
(Return NSI/DECnet address)
- b. NSI/DECnet
- c. All responses are in ASCII.
- d. No account is required to use the data base, but only 48 hours of data will be provided per request.

4. System services provided

- a. Information provided is based on the precipitation measured by the DMSP SSJ/4 electrostatic analyzers in the 32 eV to 30 keV range. All high latitude regions of precipitation observed are identified (e.g., CPS, cusp proper, etc.) the fluxes, average energies, and coordinates (geographic and magnetic) are given. The data base is online, but is not available to non-APL users except through the message system.
- b. Refer to 4a.
- c. The only online service routinely available to the community is automatically processed mail messages. A data base search program does exist (e.g., to search for coincidences or overflights of ground-based observers), but it is not routinely available. Requests for the data base search program will be handled on a case-by-case basis.
- d. Visiting scientists would ordinarily be given direct access to the online data base, which provides immediate response and includes the search program.
- e. Distribution is through ASCII text on NSI/DECnet.

5. Ordering and pricing policy

There is no charge for using the data base.

6. Design and system architecture

- a. A cluster of VAXsystems 3200. The identifications of regions of precipitation is done using a neural network.
- b. The data base format is chronological with some fairly simple compacting. The response to users always is provided in a decompacted (ASCII) format.
- c. Not applicable.

7. Software available for distribution

Not available.

8. System references and documentation

Newell, P. T., S. Wing, C.- I. Meng, and V. Sigillito. 1990. The Auroral Oval Position, Structure, and Intensity of Precipitation from 1984 Onwards: An Automated On Line Data Base. Submitted to *Journal of Geophysical Research*.

Newell, P. T., S. Wing, C.- I. Meng, V. Sigillito, and J. M. Lee. 1990. A Neural Network Based System for Monitoring the Aurora. Submitted to *The Johns Hopkins University Applied Physics Laboratory Technical Digest*.

Any mail message sent to APLSP::OVAL with subject DATA_REQUEST will generate a help message in response.

ESIS

November 21, 1990

1. Data system identification

- a. European Space Information System (ESIS)
- b. Developed in
ESRIN
Via Galileo Galilei,
I-00044 Frascati, Italy

ESRIN is an establishment of the European Space Agency.
- c. The main activities in ESRIN are data and information handling.
- d. The European Space Information System is being designed to serve the information requirements of the space science community; space science includes astronomy, astrophysics, interplanetary space physics, etc. The main goals of ESIS are to coordinate the information contained in the European science data systems and to provide users with a uniform interface to these systems. This will make it possible to obtain, compare, analyze, and exchange information in an efficient and homogeneous way.
- e. A pilot implementation of this system is under development; full implementation to be decided in 1993 on the basis of the pilot project results. In the interim, a prototype system is available that provides limited services.

2. System contact information

- a. Dr. Paola Torrente
ESRIN
Via Galileo Galilei,
I-00044 Frascati, Italy
NSI/DECnet: ESIS::PAOLA
EARN: PAOLA@IFRESA51
Telephone: 39-6-94180275
FAX: 39-6-94180361
- b. See 2a.

3. Access procedures

- a. The access to the final system will be determined.

To access the ESIS prototype from:

NSI/DECnet
JANET
Public Networks call
Internet

\$ set host ESIS (29671)
call UK.AC.NSI/DECnet-RELAY
(0222) 265001473800
telnet east.gsfc.nasa.gov
(then type esis:: at login prompt)

Username = ESIS, no password required.

- b. The primary network to access the ESIS prototype is NSI/DECnet.
- c. The prototype supports VT compatibles and emulations; the graphic display capabilities are designed for Tetronik 4010 compatibles and emulations; the final system will support a wider range of terminals and graphic equipment.
- d. The security procedures for the final system are under development; the current access to the prototype does not require any registration.

4. System services provided

- a. The ESIS final system shall provide a uniform interface to several data bases related to space sciences. During the pilot phase only the following data bases will be involved in the integrated system implementation.

i. SIMBAD

The SIMBAD data base, located at the Strasbourg Observatory in France, contains about 600,000 stars and 100,000 non-stellar objects (the only astronomical objects specifically excluded from SIMBAD are solar system bodies).

For each object, the following data are included:

- basic data (stars): coordinates, principal identification, spectral types, blue and visual magnitudes, proper motions
- basic data (galaxies): coordinates, blue and visual integrated magnitudes, morphological types, dimensions
- cross identifications for stars
- observational data for 21 data types defined in SIMBAD
- a general bibliography for the object

ii. EXOSAT

The EXOSAT data base is an online astronomical facility to access and analyze the data products and results obtained by the European X-ray Astronomy Satellite. It is located at ESTEC (Noordwijk, The Netherlands).

The data base contains:

- data products, (i.e., spectra, light curves, and images)
- data bases containing the principal results from each EXOSAT instrument for every observation
- application programs for further analysis of the data products
- observations log containing a record of the dates, targets, and pointing directions of all observations
- a bibliography containing a record of all EXOSAT publications in refereed journals, archive requests, and principle investigators

iii. STARCAT

The Space Telescope ARchive and CATalog has been implemented by ST-ECF (Space Telescope European Coordinating Facility) and ESO (European Southern Observatory, Garching, West Germany).

STARCAT provides three major features:

- **queries on astronomical catalogs:** the most frequently used catalogues have been collected from CDS, ASTRONET, and STARLINK, and are now online for querying; some important observing logs, IUE and EXOSAT as space-borne, and UKS, ESO, PALOMAR sky survey as ground-based, have also been included; the GTO catalog, a reference for all HST observations, is present as well.
- **retrieval of files from archives:** although data is not yet available, an optical disk archive is ready to receive data and images from a few different sources;
- **access to remote data bases.**

iv. VILSPA IUE DB

The International Ultraviolet Explorer Data Base is located in the Villafranca Satellite Tracking Station (near Madrid, Spain).

The data base contains:

- **detailed descriptions of IUE images taken at VILSPA and at GSFC (Goddard Space Flight Center)**
- **references to publications of IUE observations**
- **information on the IUE data tapes**

v. GDF

The Geophysical Data Facility has been developed at RAL (Rutherford Appleton Laboratory, Chilton, UK) to serve the Solar-Terrestrial Physics, Upper Atmosphere and Earth Observation research communities. The GDF data bases are at present divided into two solar-terrestrial (ST) data bases and an Atmospheric Science data base.

The AMPTE (Active Magnetospheric Particle Trace Explorers) ST data base contains:

- **summary data records from the AMPTE-UKS Spacecraft (the United Kingdom subsatellite)**
- **AMPTE UKS/IRM separation data, absolute and relative position, and velocities of AMPTE-UKS and AMPTE-IRM (the Ion Release Module)**
- **AMPTE catalog data**

The WDC (World Data Center) C-1 ST data base permits the access to:

- **catalogues of ionospheric vertical sounding data held in the WDC**
- **solar activity indices**
- **geomagnetic indices**
- **hourly values of scaled ionospheric characteristics from various ionospheric observatories**
- **MSIS-86 model of temperature and composition in the upper atmosphere**
- **catalog of incoherent scatter radar data**

vi. ESA-IRS

ESA-IRS is the Information Retrieval Service of the European Space Agency. ESA-IRS has more than 100 data collections in a broad range of subjects, permits the access to data sets hosted on other systems, and provides a number of information and support services.

At present the ESIS prototype allows native access to all the described data bases and to the following information systems:

vii. HST-Info

Bulletin board of the Hubble Space Telescope run by the Space Telescope European Coordination Facility (ST-ECF) at Garching and Munich, Germany.

viii. Astronews

Information about Astronomical Space projects.

ix. Space-Environment

The Space Environment Information System provides a set of numerical models and associated tools in order to perform analysis on:

- the terrestrial radiation environment (geomagnetically trapped particles, solar flare, and cosmic ray energetic particles)
- the geomagnetic field (e.g. IGRF, Tsyganenko)
- the upper atmosphere (MSIS-86) including atomic oxygen
- space debris and micrometeoroid fluxes
- the "charging" plasma environment (IRI, MatChg)
- solar activity

x. Solar Flares

Information on Solar Flare events compiled by the NOAA's Space Environment Laboratory.

xi. ESA_PID

The Prototype International Directory is an international network of computer-based information systems sponsored by the Committee on Earth Observation Satellites, Working Group on Data. The three main nodes of the PID are hosted by the U. S. National Aeronautics and Space Administration (NASA), the European Space Agency (ESA) and the Japanese National Space Development Agency (NASDA). Each of these directories is a free, online service based on NASA Master Directory software. In common with other PID nodes, the ESA_PID:

- describes space and earth science data sets available in Europe and throughout the world including in-situ data as well as remotely sensed data
- provides brief information about data centers and archives, coordinated data analysis projects, satellites, and instruments
- provides automatic native connections to more than forty online data systems (e.g., the ESA-Earthnet Programme Office Online Earthnet Data Availability [LEDA] Catalog and the JPL Synthetic Aperture Radar Data Catalog System)

The connection to two data bases of extragalactic source information, the National Extragalactic Data Base (NED) at IPAC/JPL, USA, and the data base of Extragalactic Sources at Meudon, France, is under development.

- b. See subsections v, ix, x, and xi of 4a for ST data sets and information systems.

- c. **ESIS will provide an integrated access to the information of the data sets/information services connected to the system:** There will be no difference in browsing and querying for scientific data, models, software, satellite schedules, or user's addresses. The user/system interaction shall be discipline oriented: Together with the general query primitives, discipline specific functions and a conceptual data model of the reality of interest to the specific community will be provided.

ESIS online services shall also include a number of functions designed to simplify the exchange of information among users:

- electronic mail*
- data, software, and documentation transfer
- remote login*
- white and yellow pages directory services*
- electronic conferencing systems*
- electronic bulletin boards
- electronic newsletters
- other services will be determined

* already provided, with limited functionality, by the prototype.

5. Ordering and pricing policy

The access to the prototype is free; the data request procedures depend on the actual data base's policies. The access to the final system will be free. The ordering and pricing policy for the actual data requests will depend, as for the prototype, on the data base that owns the data.

6. Design and system architecture

The design and system architecture will be determined.

7. Software available for distribution

None.

8. System references or documentation

Albrecht, M. A. 1991. *ESIS - A Science Information System. Data Bases and Online Data in Astronomy.* M. A. Albrecht and D. Egret, ed. Kluwer Academic Publications., Amsterdam, The Netherlands. (in preparation).

MPI Extraterrestrial Physics

September 21, 1990

1. Data system identification

- a. AMPTE/IRM Data System
- b. MPI fuer extraterrestische Physik
D-8046 Garching, Germany
- c. To do research in space plasma physics and astrophysics
- d. The purpose of MPI is to serve the AMPTE Investigator community.
- e. Operational

2. System contact information

- a. Dr. W. Baumjohann
MPI fuer extraterrestische Physik
D-8046 Garching, Germany
+49-89-32993539
NSI/DECnet: MPE::BJ
- b. Same as 2a.

3. Access procedures

- a. Via NSI/DECnet (set host mpe)
- b. NSI/DECnet
- c. VT-type, Tektronix 4010
- d. Access is restricted to AMPTE investigators or persons with an established collaboration.

4. System services provided

- a. All AMPTE/IRM data
- b. IRM magnetic field data
IRM 3-dim plasma data
IRM wave data
IRM energetic ion data

5. Ordering and pricing policy

Not Applicable.

6. Design and system architecture

Not Applicable.

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MPI

CDAW

November 25, 1991

1. Data system identification.

a. Coordinated Data Analysis Workshop (CDAW)

The current data base is CDAW 9. The CDAW 8 data base is also accessible.

b. National Space Science Data Center (NSSDC)

NASA Goddard Space Flight Center
Greenbelt, MD 20771
USA

NSSDC is funded by NASA.

c. The purpose of NSSDC is to further the use of reduced data obtained from space and earth science investigations, maintain an active data repository, and support scientific research, including creation of value-added data products. The NSSDC supplies the means for widespread dissemination and analysis of data beyond that provided by the original investigators. These services are provided to foreign requesters through the World Data Center A for Rockets and Satellites (WDC-A-R&S), which is located within the NSSDC. The primary responsibility of NSSDC is to ensure the access and use of NASA spaceflight mission data; however, data provided by non-NASA sources also are maintained.

NSSDC actively collects, organizes, stores, announces, disseminates, exchanges, and refers to a large variety of scientific data that are obtained from spacecraft and ground-based observations. Disciplines represented include: astronomy, astrophysics, atmospheric sciences, ionospheric physics, land sciences, magnetospheric physics, ocean sciences, planetary sciences, and solar-terrestrial physics.

d. The CDAW system is intended to further the conduct of large-scale collaborative scientific research, using data from many investigators to address significant global-scale physical problems that otherwise may not be addressed. The CDAW program combines a traditional workshop format with the assembly of a data base from multiple spacecraft and ground sources, where the data and relevant models have been cast into a common format, with supporting software and computer access to allow participants direct interactive graphic display and manipulation of the data. During the interval between workshops, access to the data base at NSSDC is allowed via the NSI/DECnet network. To date, all data bases have been in magnetospheric physics. The current system includes only CDAW 8 and CDAW 9; previous data bases were accessed under a different system that is being phased out.

e. The CDAW system is operating and continually developing.

2. System contact information

a. Dr. Robert McGuire
Code 933
NASA Goddard Space Flight Center
Greenbelt, MD 20771
USA

NSI/DECnet: NSSDCA::MCGUIRE
Telephone: 301-286-7794
FAX: 301-286-4952

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- b. Dr. H. Kent Hills
Hughes STX Corporation
7601 Ora Glen Drive, Suite 300
Greenbelt, MD 20770
USA

NSI/DECnet: NSSDCA::HILLS
Telephone: 301-513-1670
FAX: 301-513-1608

3. Access procedures

A personal account on the NSSDC computer is required. The contact for obtaining an account is given in section 2.

- a. To reach the system online

- i. On the NSI/DECnet network:

Enter SET HOST NSSDCA
Login to user's personal account
At the \$ prompt, enter CDAW

- ii. Via telephone:

Dial the phone number for the Rolm modem pool (baud rate is automatically self-adjusting): for odd/no parity (8 bits, 1 stop bit) ==> (301) 286-9500; for even parity (7 bits, 1 stop bit) ==> (301) 286-9000

system prompt:	you enter:
ENTER NUMBER?	NSSDCA <CR>
DIALING nnnnn	
CALL COMPLETE	<CR>

At the USERNAME: prompt, login to user's personal account
At the \$ prompt, enter CDAW

- iii. From TCP/IP nodes (i.e., Internet):

system prompt:	you enter:
\$ or %	TELNET NSSDCA.GSFC.NASA.GOV <CR>

At the USERNAME: prompt, login to user's personal account
At the \$ prompt, enter CDAW

- b. The primary network supported is NSI/DECnet. Internet is also available.
- c. A wide range of terminals is supported, including VT100, Tektronix 4105, and 4107 (also software emulators of these running on Macintosh and other PCs). The terminal should support ANSI standard text characters and commands. The CDAW software will ask you to identify the terminal type from a brief list of common ones, but if HELP is requested at that time, a complete list will be shown.

- d. To obtain an account, refer to the contact named in section 2. An account name (userid) and initial password will be established, for participants in the CDAW 9 analysis effort, subject to certain rules regarding the proprietary nature of much of the data base. Special arrangements may be required for some foreign users.

4. System services provided

- a. The CDAW system supports a range of data display and data analysis/manipulation functions for the CDAW 8 and CDAW 9 data bases. These include various graphics and listing capabilities, as well as the ability to combine and recast data as appropriate to support analysis work. The CDAW system includes brief descriptions of platforms, instruments, and data sets as the user moves through interactive screen menus and enters keystrokes to get help. The user can obtain a list of data values, written to the terminal screen, to disk file, or to magnetic tape. A hard copy of the user's guide (approximately 125 pages) to the system is available.

The CDAW 9 data base contains data from 12 spacecraft (particles, fields, auroral images) and many ground stations (magnetometers, riometers, photometers, radars), for five different intervals (approximately 16 hours each) during early 1986, selected for the period of enhanced data collection activity known as the PROMIS period (PROMIS = Polar Regions Outer Magnetosphere International Study). A hard copy catalog (approximately 70 pages) of data parameters in the data base is available to be mailed to users.

- b. See section 4a for a general description of ST data sets available.
- c. CDAW capabilities include the display of multiple parameters, versus time or another parameter, 2- and 3-dimensional plots, color-coded images calculations involving multiple parameters, and listing of data values for extraction from the system. Additional image display and analysis capabilities exist for the SUN workstation and the Macintosh computers.

NSSDC provides a bulletin board relevant to its purposes. This can be reached in a manner similar to that for CDAW, except enter BB at the \$ prompt instead of CDAW. Messages are accessible under various topics, and new topics can be defined.

NSSDC's main function is as a long-term archival data center, and in conjunction with this function, it can also provide certain reformatting and other services.

- d. CDAW workshops are organized on specific topics, and announcements are widely circulated, asking for contributions of appropriate data. Anyone may respond to these announcements. The participants normally convene in a several-day meeting to jointly study the data, after the data base has been built up from the submitted data. Visitors may contact NSSDC as in section 2 for visits at other times and to arrange access to appropriate terminals and workspace.

Visits for non-CDAW purposes may be arranged in the same manner, but the contact should be addressed to the Director of NSSDC, Dr. James L. Green, Code 930.2, Goddard Space Flight Center, Greenbelt, Maryland 20771.

- e. CDAW is mainly for correlative analysis of multiple parameters, and the display plots are on standard size paper, either color or black and white. Data values can be retrieved from the system and made available on magnetic tapes, or via network transfer of disk files.

5. Ordering and pricing policy

- a. Investigators should contact NSSDC as in section 2 to discuss their interests. There is no charge for access to the CDAW system. There is a set of rules for participants because data from many investigators resides in the data base and the suppliers' interests in the data are to be properly acknowledged.

For other NSSDC requests, charges are normally waived for duplication of reasonable amounts of research data, although there is a charge for the cost of the magnetic tapes and CD-ROMs used.

6. Design and system architecture

- a. The CDAW system is currently implemented under the VMS operating system and installed on the NSSDC VAX 8650. The system architecture consists of:
 - i. An applications executive and primary/standard user interface, which is the Transportable Applications Executive (TAE), developed at GSFC and distributed through the Computer Software Management and Information Center (COSMIC). COSMIC is a non-profit organization operated by the University of Georgia under contract to NASA to act as agent for the licensing and distribution of NASA developed software.

Address:

Computer Software Management and Information Center
382 East Broad Street
University of Georgia
Athens, GA 30602
USA
Telephone: (404) 542-3265

- ii. Specialized full-screen user interfaces using the VMS screen manager facility (DEC product).
 - iii. The primary graphics are implemented through software based on the Template graphics subroutines library package (a commercial product from Template, Inc.). Use of Template has allowed implementation of largely device-independent local software, interfacing through the Template software to a library of specific device drivers. Thus a large number of different terminals and plotters may be used.
 - iv. For data manipulation (interactive creation of new parameters by calculations involving existing parameters) and some additional graphics, the CDAW software is linked to IDL (Interactive Data Language) software (commercial) with special binding to the underlying CDAW common format (see below).
 - v. The CDAW software uses various CDF-related standard callable subroutines to obtain information as needed from the data base, which is maintained in CDF form as multiple files. See the discussion under section 6b.
- b. The CDAW software system for data retrieval, display, and manipulation is built around a data base consisting of multiple data sets all in the Common Data Format (CDF), which is described in publications referenced in section 8. The CDF format is a multi-file structure that allows efficient storage and retrieval of single- or multi-dimensional data, together with parameter label descriptions, units, and other metadata attributes as needed. Participants in CDAW workshops may submit data in almost any machine-readable format, and the NSSDC staff will convert it into CDF.

Eventually, it is intended to have portable software packages that will enable the data suppliers to readily prepare their data in CDF form, thus minimizing the NSSDC resources required to build a data base in a reasonably short period of time.

- c. The CDAW system has not been ported to other systems, and is not expected to be portable now, except possibly to other similar VAX installations with appropriate software licensing. The CDF structure and subroutine library is a distributed product from NSSDC.

7. Software available for distribution

See section 6c.

8. System references or documentation

CDAW system reference:

CDAW-9.2 User's Guide, November 30, 1989.

CDF references:

NSSDC CDF Implementer's Guide, NSSDC 88-17.

Treinish, L. A. and G.W. Goucher 1989. *NSSDC Enhances the Common Data Format*.

Treinish, Lloyd and Michael L. Gough. 1989. *A Software Package for the Data-Independent Management of Multi-Dimensional Data*.

General NSSDC references:

The National Space Science Data Center, NSSDC 90-07.

NSSDC Data Listing, NSSDC 90-06.

9. Other NSSDC systems:

NODIS, NSSDC's Online Data and Information Service, is a public online account that allows access to multiple services: NASA Master Directory, an online search system for space and earth science data; a personnel information service pertaining to those who use NSSDC services; Nimbus-7 TOMS ozone data; interplanetary medium data with hourly averaged solar wind, magnetic field and plasma data, and a limited number of solar and geomagnetic activity indices; request service for offline data and information; geophysical models related to the ionosphere, upper atmosphere, magnetospheric fields, and trapped electron and proton fluxes; CANOPUS Newsletter, a service of the American Institute of Aeronautics and Astronautics; IUE (International Ultraviolet Explorer) data request service; Nimbus 7 Coastal Zone Color Scanner (CZCS) browse-and-order system. For further information contact Nathan James at NSSDC, Code 933.

NCDS, NASA Climate Data System, uses a system similar to the CDAW system, but tailored to and emphasizing climate data from both surface and spacecraft observations. For further information contact Lola Olsen at NSSDC, Code 934.

MD

November 25, 1991

1. Data system identification

- a. Master Directory (MD)
- b. National Space Science Data Center (NSSDC)
NASA Goddard Space Flight Center
Greenbelt, MD 20771, USA

NSSDC is funded by NASA.

- c. The purpose of NSSDC is to further the use of reduced data obtained from space and earth science investigations, maintain an active data repository, and support scientific research, including creation of value-added data products. The NSSDC supplies the means for widespread dissemination and analysis of data beyond that provided by the original investigators. These services are provided to foreign requestors through the World Data Center A for Rockets and Satellites (WDC-A-R&S), which is located within the NSSDC. The primary responsibility of NSSDC is to ensure the access and use of NASA spaceflight mission data; however, data provided by non-NASA sources also are maintained.

NSSDC actively collects, organizes, stores, announces, disseminates, exchanges, and refers to a large variety of scientific data that are obtained from spacecraft and ground-based observations. Disciplines represented include: astronomy, astrophysics, atmospheric sciences, ionospheric physics, land sciences, magnetospheric physics, ocean sciences, planetary sciences, and solar-terrestrial physics.

- d. The purpose of the MD is to provide researchers a system to efficiently identify, locate and obtain access to space and earth science data sets. The MD is a free, multi-disciplinary, online information system containing data from NASA, U.S. federal agencies, universities, and international agencies that are of potential interest to the worldwide science community. The MD contains high-level descriptions of data sets and provides mechanisms for searching for data sets by important criteria such as parameters measured, temporal and spatial coverage, source (e. g., spacecraft), and sensor. In addition, the MD offers automatic connections to over twenty online information systems providing more detailed information and other data services. The MD also provides general information about selected data systems, data centers, coordinated data analysis projects, sources, and sensors. The MD has increased its accessibility with the recent implementations in Japan, Italy, and Canada.
- e. The MD is operational, with continuing development.

2. System contact information

- a. Dr. James Thieman
Code 933
NASA Goddard Space Flight Center
Greenbelt, MD 20771
NSI/DECnet > NCF::THIEMAN
Telephone: (301) 286-9790

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- b. Dr. David Irvine
Hughes STX Corporation
7601 Ora Glen Drive, Suite 300
Greenbelt, MD 20770
NSI/DECnet > NCF::IRVINE
Telephone: (301) 513-1677
FAX: (301) 513-1608

3. Access procedures

- a. To reach the system via NSI/DECnet (the old SPAN) network:

Enter SET HOST NSSDCA from the \$ prompt
Enter NSSDC at the USERNAME: prompt
(there is no password).

- i. Via telephone:

Set your terminal to full duplex, eight bits, no parity, one stop bit and 300, 1200, or 2400 baud. Dial 301-286-9000 or FTS 888-9000.

system prompt:	you enter:
ENTER NUMBER:	MD <CR>
CALL COMPLETE	<CR>
USERNAME:	NSSDC <CR>

- ii. Via Internet:

Enter TELNET NSSDCA.GSFC.NASA.GOV or
TELNET 128.183.36.23 at the system prompt.
Enter NSSDC at the USERNAME: prompt.

- b. The primary network supported is NSI/DECnet. Internet is also available.
- c. VT compatibles
Tektronix 4014 or better
HP compatibles
- d. No account is necessary. There are no restrictions on who can use the system.

4. System services provided

- a. The following services are listed as options on the MD main menu.

- i. Data Set Information Search

Each entry displays data set information including title, summary, keywords, temporal and spatial coverage, archive information, data set personnel, and bibliographic references. The MD possess the capability of searching for data sets by any combination of keywords (discipline, location, parameter measured), start and stop dates, spacecraft or data source, sensor, geographic coverage, scientific project or investigator; HELP is available from every MD screen. The MD currently holds over 1,000 descriptions of earth and space science data sets from NASA, the National Oceanic and Atmospheric Administration (NOAA), the U.S. Geological Survey (USGS), the Carbon Dioxide Information Analysis Center (CDIAC), and many other agencies and

institutions. In many cases during the search session, the MD will provide the opportunity to automatically LINK to online information systems where more detailed information may be obtained. New data set descriptions are added to the system regularly.

ii. Data System/Archive Descriptions

Each entry displays data center/system information including data center services, contacts, access procedures, available distribution media, and costs. Currently, eighty-six data centers/systems are described in the MD with automatic connections to selected data systems/catalogs through a simple LINK command. These systems include NASA's Climate Data System (NCDS), NASA's Ocean Data System (NODS), SAR Data Catalog System (SDCS), Goddard Institute for Space Studies (GISS), and the Planetary Data System (PDS).

iii. Campaign/Projects Descriptions

Each entry displays science project information such as scientific objectives, project description, data characteristics, and contacts. Past and present projects are described.

iv. Source, Spacecraft, Platform Descriptions

Each entry displays source/spacecraft/platform information such as orbital characteristics, attached instrumentation, experiments conducted, and dates of operation.

v. Sensor (Instrument) Descriptions

Each entry displays sensor/instrument information such as dates of operation, wavelength range, and spacial and spectral resolution.

- b. The MD is a directory to data sets.
- c. Online services, in addition to the directory itself, include electronic links to a variety of information systems.
- d. The services of the MD are available to visiting scientists from all countries.
- e. The distribution media depends upon the data archive center.

5. Ordering and pricing policy

Data can be ordered by contacting data archive centers.

6. Design or system architecture

- a. The MD employs a simple menu-driven interface which allows users to construct a basic query for DIFs and supplementary information. The interface is written in C and uses the C curses library for screen displays and input. In addition, the interface supports a TTY terminal mode for input and output. The MD system design allows for any SQL-based relational data base management system. Currently, the MD is operating in both the SmartStar and Oracle environments. Future developments will include INGRES and Sybase support.
- b. The MD is a direct implementation of the Directory Interchange Format (DIF). All entries to the data base are submitted in DIF form and ingested into the data base via DIF parsing software.

- c. The MD is designed for both flexibility and portability. This system uses standard C and SQL with no extensions. The MD is currently operating under multiple versions of UNIX and VMS.

7. Software available for distribution

Contact James Thieman (section 2) for further information.

8. System references and documentation

The Directory Interchange Format (DIF) Manual.

The MD Brochure, NSSDC 90-27.

9. Other systems

NASA's Climate Data System (NCDS)
NASA's Pilot Land Data System (PLDS)

NODIS

November 25, 1991

1. Data system identification

- a. NSSDC's Online Data and Information Service-formerly known as the NSSDC account (NODIS)
- b. National Space Science Data Center (NSSDC)
NASA Goddard Space Flight Center
Greenbelt, MD 20771
USA

NSSDC is funded by NASA.

- c. The National Space Science Data Center was established by NASA in 1966 to maintain an active data repository obtained from space and earth science observations, to further the use of this data, and to support scientific research involving this data.
- d. The purpose of NODIS is to provide a number of NASA and non-NASA data sets and information services online to facilitate rapid access over networks and dial-up lines.
- e. NODIS is operating and continually evolving.

2. System contact information

- a. Nathan James
NSSDC, Code 933
NASA Goddard Space Flight Center
Greenbelt, MD 20771
USA
Telephone: (301) 286-7355
NSI/DECnet: ncf::james
Internet: james@nssdc.gsfc.nasa.gov

- b. Same as 2a.

3. Access procedures

- a. To access NODIS from a computer connected to NSI/DECnet, the user should enter the command SET HOST NSSDC at the \$ prompt, and enter NSSDC at the "username" prompt. No password is necessary. Entry to NODIS, as well as other online services provided by NSSDC, is in the initial menu.

Dial-in users of NODIS can call (301) 286-9000 or (FTS) 888-9000. Enter NSSDCA at the "enter number" prompt and enter NSSDC at the "username" prompt. No password is necessary. Then, proceed as above.

- b. The primary network supported is NSI/DECnet.

- c. VT compatibles
Tektronix 4025 compatible
- d. No account is necessary. There are no restrictions on who can use the system.

4. System services provided

- a. The following services relevant to space physics are listed as options on the NODIS account menu:

- i. NASA Master Directory (MD)

The NASA Master Directory is an online search system providing brief overview information about NASA and important non-NASA space and earth science data, and data information systems. More importantly, in many cases the directory offers automatic network connections to catalogs or information systems where more detailed information about data of interest may be obtained. The directory is easily accessed via network or dial-in line and can be used by an inexperienced person without the need to consult a user's manual (online help is available).

Contact: J. Thielemann

- ii. NSSDC's Personnel Information Management System (PIMS)

The Personnel Information Management System is designed to electronically aid the science user in locating and accessing personnel/user information pertaining to colleagues. PIMS also acts as a populating/updating tool to the NSSDC personnel /user data base and will assist NSSDC in keeping the data base current. Within PIMS, the following information items are displayed:

- the person's full name and title
- workplace mailing address
- phone number
- geographical location
- electronic addresses

Contact: N. James

- iii. Interplanetary Medium Data (OMNI)

This service enables the user to access hourly-averaged, near-earth solar wind magnetic field and plasma data and a limited number of solar and geomagnetic activity indices. The file currently spans the period 1973 to 1990 and is occasionally updated. The user is able to choose any subset of the 37 words per hourly record for any time span, and to either list the selected data to a terminal screen or create an ASCII or binary file for downloading to a computer.

Contact: J. King

- iv. Request Offline Data and Information

The Data Request Service allows users to request NSSDC-held offline data sets. General queries or comments may also be made to the data center within this service. Messages referring to a particular NSSDC service will be forwarded to the responsible personnel.

Contact: C. Ng

v. NSSDC Geophysical Models

Geophysical models allow users to advance from monitoring the environment to forecasting it. NSSDC maintains a large archive of models and related software for the ionosphere, atmosphere, and magnetosphere. The most important models are available online via the NODIS account. They include:

- IRI model (ionosphere)
- MSIS model (upper atmosphere)
- Magnetospheric Field models and programs
- Trapped Proton and Electron models, AP8 and AE8

Contact: D. Bilitza

vi. CANOPUS Newsletter

The CANOPUS Newsletter is a free service of the American Institute of Aeronautics and Astronautics (AIAA) and its Technical Committee on Space Science and Astronomy. This service allows its users to read articles published over the past year, view the calendar of events for the upcoming year, view NASA's launch schedule, submit letters to the editor, and read letters to the editor.

vii. STEP Bulletin Board

STEP is the Solar-Terrestrial Energy Program, an international effort to coordinate space and ground data acquisition and analysis. The purpose of STEP is to uncouple the complex flow of energy from the sun through the interplanetary medium and the geomagnetosphere to Earth. The bulletin board describes the several STEP working groups, projects, activities, and meetings of each.

Contact: J. King

viii. Standards and Technologies

This NODIS option enables users to identify documents describing various data system-relevant standards and technologies.

Contact: D. Sawyer

- b. The online services include the browse facility and the request services.**
- c. The services of NSSDC are available to visiting scientists from all countries. However, advance notice is recommended.**
- d. The data held by NSSDC is available online and in hard copy, CD-ROM, tape, and floppy disk for use on PCs.**

5. Ordering and pricing policy

Requests for offline data and information is option 5 in NODIS. In addition, requests may be made by:

Telephone: (301) 286-2864
Telex 89675 NASCOM GBLT
NSI/DECnet: ncf::request
Internet: request@nssdc.gsfc.nasa.gov

There is no charge for these services.

6. Design and system architecture

- a. The NODIS system is a menu-driven user interface to each of the individual subsystems accessible through it. NODIS itself is written in the VMS/VAX command language and references command files controlling additional software specific to each of these subsystems. Those potentially relevant to ST research are referenced in 4a by name and function. The NODIS interface incorporates software to access the NSSDC personnel data base for identification of users and data management records for statistical and security purposes.
- b. There is no specific data format for NODIS. Each subsystem has its own format.
- c. The NSSDC is developing modular software with well defined interfaces. This design may allow the software to be portable so that it can be shared with the NSSDC and other computer facilities that use VMS. At this time, NODIS has not been ported.

7. Software available for distribution

See section 5 and option 5 in NODIS.

8. System references and documentation

The National Space Science Data Center, NSSDC 88-26.

Copies are available on request.

9. Other systems

CDAW - Coordinated Data Analysis Workshop
NCDS - NASA Climate Data System

SSC

November 25, 1991

1. Data system identification

- a. Satellite Situation Center (SSC)
- b. National Space Science Data Center (NSSDC)
NASA Goddard Space Flight Center
Greenbelt, MD 20771, USA

NSSDC is funded by NASA.

- c. The purpose of NSSDC is to further the use of reduced data obtained from space and earth science investigations, maintain an active data repository, and support scientific research, including the creation of value-added data products. The NSSDC supplies the means for widespread dissemination and analysis of data beyond that provided by the original investigators. These services are provided to foreign requesters through the World Data Center A for Rockets and Satellites (WDC-A-R&S), which is located within the NSSDC. The primary responsibility of NSSDC is to ensure the access and use of NASA spaceflight mission data; however, data provided by non-NASA sources are also maintained.

NSSDC actively collects, organizes, stores, announces, disseminates, exchanges, and refers to a large variety of scientific data that are obtained from spacecraft and ground-based observations. Disciplines represented include: astronomy, astrophysics, atmospheric sciences, ionospheric physics, land sciences, magnetospheric physics, ocean sciences, planetary sciences, and solar-terrestrial physics.

- d. The SSC is designed to serve the planning needs of investigators and project offices. It coordinates data acquisition and collaborative efforts pertaining to spacecraft science operations, including single- and multiple-spacecraft activities with related ground-based observations.
- e. Version 1.4 of the SSC software system was released in August 1990. This release consisted of a set of sixteen report and graphics programs on a VAX/VMS cluster and on a SUN/UNIX workstation. It is available also on QIC-24 formatted cartridge tape and via Internet or NSI/DECnet. Remote access to this version of the software can be provided in special cases. The system is installed and currently used at the NSSDC's SSC Operations office and the ISTEP/GGS Science Planning Operations Facility (SPOF).

The next release of the SSC software system, version 2.0, will include new capabilities such as PHIGS based 3-dimensional ephemeris and magnetospheric region display and a new user-friendly interface to report generating capabilities such as spacecraft position, region, and magnetic conjunction listings.

2. System contact information

- a. Dr. H. Kent Hills
Hughes STX Corporation
7601 Ora Glen Drive
Greenbelt, MD 20770, USA

NSI/DECnet: NSSDCA::HILLS
Internet: HILLS@NSSDCA.GSFC.NASA.GOV
GFSCMAIL: KHILLS
TELEMAIL: (X.400)-
(C:USA,ADMD:TELEMAIL,PRMD:GSFC,O:GSFCMAIL,UN:KHILLS)
Telephone: (301) 513-1670
FAX: (301) 513-1608

- b. Same as in 2a.

3. Access procedures

- a. Currently, the system is not open to public access. However, exceptions can be made to those with special requests. Also, certain information about spacecraft ephemeris data predictions is available in public access files.
- b. NSSDC is on NSI/DECnet, Internet, and BITNET.
- c. Not Applicable.
- d. Not Applicable.

4. System services provided

- a. The SSC currently supports a data base containing a wide range of definitive and predictive ephemeris data for more than 25 IACG spacecraft, and provides spacecraft ephemeris predictions and trajectory plots for science operations planning and for data correlation: it does not provide spacecraft tracking information. Plots can be produced showing trajectories of spacecraft, comets, and planets in a sun-centered coordinate system. Plots can also be produced in a variety of earth-centered systems, showing spacecraft trajectories, sub-satellite points, end-points of magnetic field lines passing through the spacecraft, etc., and also showing the bow shock, the magnetopause, and the boundaries of various magnetospheric regions. Time marks can be included. Other non-graphical programs follow a spacecraft trajectory and trace magnetic field lines to the surface of the earth to determine when a spacecraft is in magnetic conjunction with a specified ground location, or to determine when two or more spacecraft are on the same magnetic field line. A variety of magnetic field models are available to the user. Listings can be produced, including various additional magnetic parameters, L-value, magnetospheric region, and the location in GEI, GSE, GSM, and SM coordinate systems. For heliocentric spacecraft, list outputs can be generated providing ecliptic latitude, longitude, range, heliographic latitude and longitude, as well as radial alignment of such spacecraft.
- b. Any current spacecraft can be supported. Any other actual or planned spacecraft can be supported if orbital elements are available. For many applications, minute-by-minute Cartesian coordinates are first computed in inertial coordinates, using other Goddard Space Flight Center resources. These results comprise a portion of the inputs for the SSC programs.
- c. See section 4a.
- d. Visits may be arranged by contacting NSSDC as in section 2. Staff scientists familiar with the programs are available for discussion to help determine the appropriate software to use.
- e. Non-graphical outputs can be transmitted to requesters via networks; plots are sent by airmail. List outputs for some spacecraft can be accessed as files in the globally accessible account ANON_DIR:[ACTIVE].

5. Ordering and pricing policy

Requesters should contact NSSDC as in section 2. Charges are normally waived for reasonable amounts of data for research purposes.

6. Design and system architecture

- a. The system software currently operates on the NSSDC VAX/VMS system and on a SUN/UNIX workstation. Fortran and C languages are used. The graphics displays currently use the Tektronix AGII graphics package, which supports Tektronix 4100 series terminals and emulators. New 3-dimensional PHIGS-based graphics programs are becoming available which can be run on X-window capable workstations and terminals. Release 2.0 of the SSC software system, which is due in January 1992, will contain the first of these new graphics programs.
- b. The ephemeris information is stored in the system data base as a series of data sets in the CDF format (see section 8).
- c. The software is in the process of being made portable to other VAX/VMS and UNIX machines. Enhancements to the user interface are in progress, to facilitate appropriate use by persons not familiar with the internal complexities of the programs.

7. Software available for distribution

Programs are now available on a test/evaluation basis, for SUN workstations and VAX/VMS. Release 1.4 of the SSC software system and the accompanying user's guide are currently available. For the UNIX version, a QIC-24 cartridge data tape is available. These programs can also be distributed over the computer network.

8. System references and documentation

SSC references:

Blair, G. 1991. *SSC User's Guide*.

Sanderson, T. R., et al. 1990. World-Wide Interactive Access to Scientific Databases via Satellite and Terrestrial Data Network, *ESA Bulletin* No. 61.

This paper contains examples of three different commonly-used SSC plots and other information relating to the SSC.

General NSSDC references:

The National Space Science Data Center, NSSDC 90-07.

NSSDC Data Listing, NSSDC 90-06.

CDF references:

NSSDC CDF Implementer's Guide, NSSDC 88-17.

NSSDC CDF User's Guide for UNIX Systems, Version 2.1. NSSDC 91-30.

NSSDC User's Guide for VMS Systems, Version 2.1. NSSDC 91-31.

Treinish, L. and M. L. Gough. 1989. *A Software Package for the Data-Independent Management of Multi-Dimensional Data.*

Treinish, L. and G. W. Goucher. 1989. *NSSDC Enhances the Common Data Format.*

PDS Overview

May 27, 1990

1. Data system identification

- a. Planetary Data System (PDS)
- b. Planetary Data System Project
Jet Propulsion Laboratory
4800 Oak Grove Drive
Pasadena, CA 91109
USA

PDS is sponsored by NASA.

- c. The purpose of the Jet Propulsion Laboratory is to serve as a principal agency in exploring the planetary system for NASA.
- d. The purpose of the Planetary Data System is to develop cost effective mechanisms for ingesting, curating, distributing, and using digital planetary science data.
- e. PDS is operating and continually evolving.

2. System contact information

- a. Dr. Tom Renfrow, Manager, Planetary Data System
Jet Propulsion Laboratory
4800 Oak Grove Drive
Pasadena, CA 91109
USA
Telephone: (818) 354-6347
NSI/DECnet: jplpds::trenfrow
Internet: trenfrow@jpl-pds.jpl.nasa.gov
- b. Dr. Tom Renfrow
Jet Propulsion Laboratory
4800 Oak Grove Drive
Pasadena, CA 91109
USA
Telephone: (818) 354-6347
NSI/DECnet: jplpds::trenfrow
Internet: trenfrow@jpl-pds.jpl.nasa.gov

3. Access procedures

- a. To access PDS via NSI/DECnet, the user can use the command SET HOST JPLPDS at the \$ prompt, and then enter the ID assigned by the PDS for the particular user. The system can also be accessed using the Telnet protocol on Internet. The address is JPL-PDS.JPL.NASA.GOV. After the user has signed on the system he/she should give the command PDS at the \$ prompt.

Dial-in users can call (818) 354-8430 for a 1200 baud connection. Other lines are available but the user should contact the PDS Hot Line for these numbers, (818) 354-7587.

A guest account is also available, but has very limited capabilities. The ID on the PDS VAX for this account is PDSGUEST; there is no password.

- b. Originally the principal network was NSI/DECnet; however, much better performance has been obtained by using Internet.
- c. The system is designed to work with the VT100. Many of the escape sequences specific to the VT100 are used, and it is very difficult to use the system if one cannot at least emulate a VT100.
- d. The PDS is intended to be used by planetary scientists who are sponsored by the Solar System Exploration Division of NASA. To obtain an account, call the PDS Hot Line at (818) 354-7587.

4. System services provided

- a. The user can obtain information about the planetary science data sets that are contained within the PDS system. A high-level catalog contains information about each data set, the various planetary targets, the various spacecraft, and the attached instruments. The user can get information about the various planetary scientists having data in the system and much information about the six PDS Discipline Nodes which provide the scientific expertise in understanding the data sets. There are also detailed level catalogs (one for each discipline—only two have been developed to date) which provide detailed information for the data sets.
- b. The data sets that are on the system currently include Voyager image data sets and fields and particles data. There are a number of data sets related to atmospheric studies. There are also ground-based and space-based spectroscopic measurements.

Currently, all data on the system is from past missions. Soon, there will be data from the Magellan project.

- c. When the user accesses the PDS Catalog, he/she can examine the catalog to determine the data sets that are available. Once these sets are identified, the user can place an order for the data sets. The user can also connect to the Discipline Node systems via the Central Node. The user can also send comments and/or questions to the PDS Operator. Textual information about the system itself can also be obtained from one menu option.
- d. The PDS can be used by visiting scientists. The scientists should contact the Discipline Node Manager in the discipline in which the scientist specializes.
- e. There are three principal media for distribution: magnetic tapes, electronically via NSI/DECnet or Internet, and CD-ROMs.

5. Ordering and pricing policy

"Ordinary-sized" orders are filled automatically and at no cost to the scientist. The PDS does not have a good definition of "ordinary-sized" yet. For large orders that are filled directly by NSSDC, the person ordering the data from NSSDC will negotiate directly with NSSDC to cover the charges. For specialized orders requiring extensive processing, Discipline Nodes funds will be transferred from the requestor's NASA funding to the PDS to cover the cost of the order.

6. Design and system architecture

- a. The system is menu based. The menu system is controlled by the TAE system developed at NASA Goddard. For each choice the user can make in conducting a search, help is available regarding the definition of terms and values that can be selected. The queries are formulated by the system into an SQL (relational) query which is sent to a Sharebase 500 hardware data management system. The results of the query are displayed on the terminal.

The computer being used for this system is a VAX 11/780.

- b. The system uses a relational model for the data base. PDS labels in the ODL language are attached to all distributed data sets. These labels are intended to completely describe the format and content of the data sets.
- c. The software can be transported to other systems. The introductory menu system has already been transported to all the Discipline Nodes. All the data base queries are written in the SQL language which has become a standard. There is some code which is dependent on having a VT100 and also the VMS operating system.

7. Software available for distribution

- a. The Discipline Nodes have data examination software available for distribution. The Central Node has software that can be used to display images that are found on the CD-ROMs that the PDS produces.
- b. In most cases, no commercial software is needed to use the software.

8. System references and documentation

When a user signs up, a PDS User's Guide is sent to him/her. There is also a data dictionary and catalog design document that may be useful to designers of similar systems. There are many system development documents which completely describe all phases and aspects of the system, but these documents are not usually sent to the users.

9. Other systems

Each of the six Discipline Nodes have software systems that the users should be familiar with. There is also useful software for computing geometry parameters available from the NAIF Node at JPL.

PDS Geosciences Node IRPS

August 9, 1990

1. Data system identification

- a. Image Retrieval and Processing System (IRPS)
- b. Washington University
Earth and Planetary Remote Sensing Laboratory
Campus Box 1169
St. Louis, MO 63130
USA

IRPS is funded by NASA.

- c. The Earth and Planetary Remote Sensing Laboratory is part of the McDonnell Center for the Space Sciences at Washington University. The laboratory supports research on the geology and geophysics of planetary surfaces, including the Earth's surface. The laboratory is the lead Geosciences Node for NASA's Planetary Data System (PDS).
- d. IRPS provides access to planetary image data and related information via electronic catalog searching and digital image processing. IRPS is used by local research staff and visitors, as well as remote users who access the system through the PDS Central Catalog. IRPS is also used by the NASA Regional Planetary Image Facilities (RPIFs). Some RPIFs maintain copies of IRPS at their home institutions; others use NSI/DECnet for network access to IRPS at Washington University.
- e. IRPS is operating.

2. System contact information

- a. Dr. Edward A. Guinness or Ms. Susan Slavney
Washington University
Campus Box 1169
St. Louis, MO 63130
USA
Telephone: (314) 935-5493
NSI/DECnet: WURST::GUINNESS or WURST::SLAVNEY
- b. Susan Slavney (see 2a).

3. Access procedures

- a. The system may be accessed three ways:
 - locally at Washington University, using a user or guest account
 - via automatic login from the PDS Central Catalog
 - and through one of the RPIFs that has access to IRPS, using the RPIF's account

IRPS is not available for general access over NSI/DECnet.

- b. NSI/DECnet is used for remote logins from PDS and the RPIFs.
- c. IRPS operates on a VT220-type terminal. Local users may use an analog videodisk player for browsing the image data base and a monitor for displaying digital images.

- d. Use of IRPS is restricted to local staff, students, visitors, RPIF personnel and visitors, and PDS Catalog users. Accounts are usually not issued to individual remote users, except for those working with laboratory personnel on a particular project. Persons wishing to use IRPS may arrange a visit to the laboratory or to another RPIF, or they may contact the PDS for access to the PDS Catalog. RPIFs in the United States are located at the Jet Propulsion Laboratory, USGS Flagstaff, Arizona State University, University of Arizona, the Lunar and Planetary Institute, Cornell University, Brown University, and the University of Hawaii. In addition, there are RPIFs in London, Paris, Rome, Germany, and Japan.

4. System services provided

- a. IRPS provides access to a catalog of planetary image data and related information about instruments, spacecraft, and missions. The catalog includes specific information about individual images that can be used to constrain a search, such as image latitude and longitude, resolution, time of acquisition, lighting and viewing geometry information, etc. The catalog also includes an inventory of the location of digital images on magnetic tape and compact disk. The actual images are not kept online, but can be retrieved from the storage media for processing.
- b. The catalog contains detailed information for the Viking Orbiter image collection, and for images from the Voyager encounters of Jupiter, Saturn, and Uranus.
- c. Remote and local users may search the IRPS catalog, display the results of a search on the terminal screen, and create a summary report of the search results. The report may be printed locally or copied to a remote node. Local users may use the videodisk player when displaying records from the image data set, so an analog version of an image appears on the videodisk monitor when its record appears on the terminal. This feature is useful for selecting individual images to study. Local users may also restore digital images from tape or CD-ROM and use the PICS (Planetary Image Cartography System) software package to process and display the data.
- d. Visiting scientists are welcome to use the facility. Advance notice is required.
- e. 9-track magnetic tape, TK50 tape cartridge, and 8 mm helical-scan tape, all for VAX/VMS machines.

5. Ordering and pricing policy

Not applicable.

6. Design and system architecture

- a. Software: IRPS runs under TAE (the Transportable Applications Executive), an easy-to-learn, menu-driven interface that can be used from a VT100- or VT200-type terminal. The data base management system used for IRPS is System 1032 by Compuserve. Software developed at the laboratory, in FORTRAN and in the System 1032 query language, manages communication between the user interface and the DBMS. The image processing software used is PICS (the Planetary Image Cartography System), developed and maintained by the U.S. Geological Survey, Flagstaff, Arizona.

Hardware: IRPS runs on a MicroVAX II computer from Digital Equipment Corporation. The MicroVAX II uses the VMS operating system, version 5.x.

- b. Data base information is stored online in System 1032 proprietary format files. Images are stored offline in EDR format.

- c. IRPS has been installed on other VAX/VMS computers without difficulty. No attempt has been made, nor is any planned, to port to other hardware or software environments.

7. Software available for distribution

IRPS is not available for distribution to the general public, due to limited resources for distributing and maintaining the software.

8. System references and documentation

Arvidson, Raymond E., Susan H. Slavney, and Edward A. Guinness. 1987. *Image Retrieval and Processing System (IRPS) Software Requirements Document*, Washington University.

Slavney, Susan H., and Edward A. Guinness. 1989. *Image Retrieval and Processing System (IRPS) Software Specification Document*, Washington University.

Slavney, Susan H., and Edward A. Guinness. 1989. *Image Retrieval and Processing System (IRPS) User's Guide*, Washington University.

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PDS NAIF Node

November 25, 1991

1. Data system identification

a. Navigation Ancillary Information Facility (NAIF)

Note: The word "facility" is misleading. NAIF is much less a data facility than it is a data system development organization.

b. Navigation Systems Section (314)

Jet Propulsion Laboratory
Mail Stop 301-125L
4800 Oak Grove Drive
Pasadena, CA 91109
USA

NAIF is funded by several sources within NASA.

- #### c. JPL's Navigation Systems Section provides ephemeris development, spacecraft orbit determination, and allied services for a wide assortment of NASA, national, and international flight projects and research activities.
- #### d. NAIF is developing the SPICE concept, a system for assembling, archiving, distributing, and providing easy user access to those fundamental ancillary (supplemental) data needed by scientists who are planning or reducing space science observations. Examples of ancillary data are:

- spacecraft ephemeris
- planet, satellite, comet, or asteroid ephemeris
- planet, satellite, comet, or asteroid physical and cartographic constants
- science instrument platform pointing direction (as a function of time)
- instrument mounting alignment and selected additional instrument information
- spacecraft command logs, supplemented with ground data system and experimenter notebook logs

The principal intended use is by the planetary science community. However, NAIF is also supporting the Hubble Space Telescope Project (Moving Object Support System) and anticipates further expansion into the space physics, astrophysics, and earth science disciplines.

- #### e. As a node of the Planetary Data System (PDS), NAIF is officially operating, although there are very limited data sets available which have been peer reviewed and formally registered in the PDS catalog.

On an informal basis, NAIF has delivered a wide assortment of trajectory, ephemeris, and Voyager instrument pointing data sets. Allied NAIF Toolkit software (FORTRAN subroutines source code, plus related documentation and utility programs) also has been delivered to scientists and engineers interested in integrating the SPICE methodology into their own data systems. Elements of the SPICE system are in various stages of maturity; ranging from fairly mature third generation trajectory and ephemeris data products (S- and P- kernels) and allied Toolkit software to a very preliminary set of functional requirements for the spacecraft command log (E-kernel).

As a supplier of SPICE kernel file specifications, NAIF is actively supporting the Voyager, Magellan, Mars Observer, Galileo, and CRAF flight projects so that the software is able to calculate instrument observation geometry patterns. Work has just started on the CRAF and Cassini projects. After one year of evaluation, the Soviet space program has decided to use the SPICE system on the MARS 94 project, and is considering its use to support additional projects such as RADIOASTRON and INTERBOL.

NAIF has built, and is currently extending the functionality of, the Hubble Space Telescope Moving Object Support System which is used for detailed planning and generating tracking files for HST's solar system (moving target) observations.

2. System contact information

- a. NAIF Operator
Mail Stop 301-125L
Jet Propulsion Laboratory
4800 Oak Grove Drive
Pasadena, CA 91109 USA
NSI/DECnet: NAIF::PDS_OPERATOR or 5122::PDS_OPERATOR
Internet: pds_operator@naif.jpl.nasa.gov (128.149.16.3)

- b. Mr. Charles H. Acton (Chuck)
NAIF Task Manager
Mail Stop 301-125L
Jet Propulsion Laboratory
4800 Oak Grove Drive
Pasadena, CA 91109 USA
Telephone: (818) 354-3869 (FTS) 792-3869
NSI/DECnet: NAIF::CHA or 5122::CHA
Internet: cha@naif.jpl.nasa.gov (128.149.16.3)
NASAMAIL: CACTON

3. Access procedures

At present there are no online capabilities available. Orders for SPICE kernel data and/or NAIF Toolkit software may be placed through the user support contact in 2a, or through the Planetary Data System.

4. System services provided

- a. Data (SPICE kernel files) provided are:
 - Ephemeris data (S- and P- ephemeris) for planets, satellites, comets, and asteroids in the NAIF SPK kernel file format with ANSI FORTRAN 77 subroutines needed to read these files.
 - Spacecraft trajectory and planet/satellite ephemeris data for the Voyager 1 and Voyager 2 spacecraft for each planet flyby (Jupiter, Saturn, Uranus, Neptune) with ANSI FORTRAN 77 "reader" as above.
 - Selected planet and satellite physical and cartographic constants (PcK kernel).
 - Camera pointing data (C-kernels) for Voyager 2 pictures taken during the Uranus and Neptune encounters with ANSI FORTRAN 77 "reader" as above.
 - LEAPSECONDS and SCLK Coefficients files, needed for time conversions among UTC (GMT), Ephemeris Time (ET), and several JPL spacecraft clocks (SCLK).

Software provided:

NAIF has built a library of portable ANSI FORTRAN 77 modules used to read the SPICE kernel files, and to use the data thus extracted from kernel files to compute most useful instrument observation geometry parameters. The source code for these modules, which is highly documented, is available as "SPICELIB"—the principal component of the NAIF Toolkit. Other elements of the Toolkit are several miscellaneous data files, several related utility programs, porting instructions, test programs, SPICELIB demonstration programs (called "cookbook programs"), and additional documentation for several families of subroutines.

- b. Trajectory and ephemeris data from the Galileo flyby of Earth in December 1990 is available, although these data have not been peer reviewed.
- c. None at present. A product catalog or inventory may be developed during FY92.
- d. None.
- e. COPY from the NAIF VAX via NSI/DECnet
COPY from the NAIF SUN using anonymous ftp (available Winter 1991)
"Pushed" to your computer's guest account via Internet (ftp)
One-half inch industry standard magnetic tape
 - * VAX/VMS BACKUP format
 - * ANSI labeled tape (VAX/VMS COPY command)UNIX tar tape (SUN 0.25 inch cartridge tape drive)
IBM PC/AT 1.44 MB 5.25 inch floppies
MAC high density 3.25 inch diskettes

5. Ordering and pricing policy

Support is given to NASA-funded scientists and programs. Best efforts basis support is given to other non-commercial requestors. No charges are made. Requests should be made to the user support contact noted in section 2a.

6. Design and system architecture

- a. Not Applicable.
- b. Data sets, called SPICE kernel files, are formatted per NAIF kernel specification documents. In the future, these may be further formatted as Standard Format Data Units (SFDUs). NAIF provides FORTRAN 77 subroutines to read these SPICE kernel files; users integrate these subroutines into their data analysis system at their home site.
- c. The NAIF Toolkit was implemented with portability as a key design element. Environment dependencies have been isolated to less than twenty modules, which contain clear instructions on needed changes to adapt to your own hardware/software. In addition, the NAIF Toolkit has been pre-ported to and tested on several popular computer/operating system environments:

VAX/VMS 4.7 or 5.x with VAX FORTRAN Vers. 4.8
SUN OS 4.1 with SUN FORTRAN Vers. 1.3

IBM PC or clone:

Microsoft FORTRAN Vers. 5.0 (need about 600 Kbytes of memory)

Earlier versions of the Microsoft FORTRAN compiler are not fully ANSI FORTRAN 77 compliant and will not properly compile NAIF's SPICELIB software.

PC with 386 or 486 CPU:

Lahey FORTRAN F77LEM/32 Version 2.01

Macintosh with Language Systems FORTRAN Vers. 1.2.1 or higher

7. Software available for distribution

- a. The NAIF Toolkit, the principal component being the SPICELIB FORTRAN 77 subroutine library, is the available software (see 4a).
- b. A fully ANSI FORTRAN 77 compliant compiler is required on the user's host computer. Recommended useable memory is >600 Kbytes.

8. System references and documentation

A brochure, *Kernel Knowledge*, provides a substantial overview of the SPICE system from a user's perspective.

PDS Planetary Atmospheres Node PANDA

November 25, 1991

1. Data system identification

- a. Planetary Atmospheres Node Data Analysis software (PANDA)
- b. Planetary Data System Planetary Atmospheres Discipline Node
Laboratory for Atmospheric and Space Physics
University of Colorado
Boulder, CO 80309
USA

The Discipline Node is funded by NASA.

- c. The purpose of the PDS Atmospheres Node is to curate and to provide access to planetary atmospheres data sets from NASA's planetary exploration missions, and to provide researchers expertise in using the available data sets.
- d. PANDA is intended to provide easy access to the data sets resident at the Discipline Node. Data subsets can be created with user-specified constraints, written to ASCII files with PDS labels, and copied over a network to the user's host computer. PANDA also provides a variety of display and analysis capabilities.
- e. PANDA is operating and continually developing.

2. System contact information

- a. Dr. Steven W. Lee
Laboratory for Atmospheric and Space Physics
Campus Box 392
University of Colorado
Boulder, CO 80309
USA
Telephone: (303) 492-5348
NSI/DECnet: ORION::LEE
BITNET: LEE@COLOLASP
INTERNET: lee@syrtris.colorado.edu

- b. Same as 2a.

3. Access procedures

- a. To obtain a demonstration of PANDA from a computer connected to NSI/DECnet, enter the command SET HOST ORION and enter PDSDEMO at the "username" prompt. No password is necessary; however, only a demonstration of the system is available through this account. Individual user accounts are necessary to access PANDA's retrieval and analysis capabilities.

Dial-in users may access PANDA by connecting to (303) 492-2728, -3708, or -5711. Enter PDSDEMO at the "username" prompt, then proceed as above.

- b. The primary network supported is NSI/DECnet.

- c. The PANDA user interface is designed to run with VT100-compatible terminals and emulators. The graphic display capabilities are designed to use a variety of graphics terminals (Tektronix 4014, 4025, 4105, 4107, GraphOn, etc.) and emulators (VersaTerm, PC Plot, etc.).
- d. To obtain an account, contact Dr. Steven W. Lee at the address listed in 2a.

The user community supported by the PDS are those researchers funded through NASA planetary exploration programs. The Atmospheres Node is intended to support researchers in planetary atmospheres.

4. System services provided

- a. A variety of data sets related to planetary atmospheres are stored both online and offline. Users may request that an offline data set be moved online. Users can browse any online data set, and are given text descriptions of each data set and every parameter in the data set. User-specified constraints can be supplied to retrieve data subsets. Such subsets can be copied to the user's host computer, or may be analyzed and/or displayed with the capabilities provided by PANDA.
- b. The data sets currently available through the Atmospheres Node all relate to the atmosphere of Mars. These include cloud catalogs derived from Mariner 9 and Viking Orbiter imaging and Infrared Thermal Mapper (IRTM) data, meteorology data from the Viking Landers, atmospheric opacity data derived from Viking Lander imaging, and data from the Viking Mars Atmospheric Water Detector (MAWD). The data holdings will expand regularly to include data from past and future planetary exploration missions such as Voyager, Pioneer Venus, Galileo, and Mars Observer.
- c. The PANDA software is a menu-driven system, eliminating the need for users to become familiar with high-level languages for accessing and manipulating the data. To retrieve data from the data base, the system provides a series of menus that prompt the user for the construction of SQL (Structured Query Language - a standard language for querying relational data bases) queries used to constrain any data set resident on the data base. Data records meeting the constraints applied by the query are written to labelled ASCII data files. Subsequent menus allow data to be loaded from files into data analysis objects such as real vectors. The analysis objects can be manipulated (numerous arithmetic and trigonometric functions, binning, smoothing, etc., are available) and plotted interactively by the user; the appearance of the plots can be easily customized using the provided menus. Plots can be displayed directly on the user's terminal or saved as files that can be transferred to the user's host system and printed on a local printer. A uniform user interface is provided for all of the above capabilities; once familiar with the system, the user continues to employ the same procedures, even as new data sets are added to the data base or new capabilities are added to PANDA. Other services provided are online tutorials for instructing novice users, a bulletin board system, online information about the PDS and the Atmospheres Node, a directory of files stored in the user's workspace, and a means of reporting problems or comments to Node personnel.
- d. By prior arrangement, visitors to the University of Colorado may use PANDA's and the Atmospheres Node's capabilities. Temporary office space and access to computer facilities is available to visitors. Visits should be arranged by contacting Dr. Steven W. Lee at the address listed in 2a.

- e. The primary method of data distribution that the Atmospheres Node supports is direct file transfers that the user initiates. If the files are too large to transfer over a computer network, then the files may be written to magnetic tape through special arrangements with the Node manager (see contact information in 2a).

5. Ordering and pricing policy

The use of the PDS Atmospheres Node is provided at no cost. It is expected that most users will want to obtain relatively small subsets of the larger data sets available through PANDA. Requests for large quantities of data (requiring more than one magnetic tape) will be considered on a case-by-case basis and may be referred to the National Space Science Data Center.

6. Design and system architecture

- a. PANDA uses the data analysis and display capabilities of IDL (the Interactive Data Language), runs on a VAX 11/785 under VMS, and communicates with a ShareBase/Britton Lee IDM500 Relational Data Base Management System (RDBMS), where the data base itself resides.
- b. The online data sets reside on a ShareBase/Britton Lee IDM500 Relational Data Base Management System (RDBMS).
- c. The system should be portable to other hardware environments running under VMS and on which IDL (the Interactive Data Language) is installed. With minor modification to the software, the ShareBase/Britton Lee IDM500 RDBMS should be replaceable by any relational data base system compatible with SQL (Structured Query Language).

7. Software available for distribution

PANDA is not intended for general distribution. Given the environment outlined in 6c, the software and associated documentation may be provided to other installations.

8. System references and documentation

Planetary Atmospheres Node Data Analysts Software User's Guide, Draft 12. July 1989. (current revision in preparation).

Copies are provided to registered users of the PDS Atmospheres Node (see 3d).

PDS Planetary Plasma Interactive Node

May 15, 1990

1. Data system identification

- a. Planetary Plasma Interactive Node (PPI) of the Planetary Data System (PDS)
- b. Institute of Geophysics and Planetary Physics
University of California, Los Angeles
Los Angeles, CA 90024-1567
USA

The Planetary Plasma Interactive Node is sponsored by the Planetary Data System at the Jet Propulsion Laboratory.

- c. The Institute of Geophysics and Planetary Physics (IGPP) is an organized research unit of the University of California. Scientific members of IGPP are engaged in research in variety of fields of geophysics. IGPP also has a staff of professional engineers and programmers who support the research activities of institute scientists.
- d. The Planetary Data System (PDS) was established by NASA to make high quality planetary data readily accessible to the planetary science community. The Planetary Plasma Interactive (PPI) Node of PDS helps planetary scientists solve problems associated with locating and acquiring data for planetary plasma and magnetospheric investigations. PPI provides the science community with access to catalog and inventory information about fields and particles data as well as a system with which to browse the data and carry out preliminary scientific investigations. There is a system for researchers to order the data and ship it to their home institutions. We also provide users with access to data analysis tools and access to empirical and theoretical models. The PPI Node has a distributed architecture with subnodes at the University of Iowa, Goddard Space Flight Center, and UCLA.
- e. The Planetary Data System and the Planetary Plasma Interactive Node are operating.

2. System contact information

- a. Dr. Raymond J. Walker
Institute of Geophysics and Planetary Physics
UCLA
Los Angeles, CA 90024-1567
USA
Telephone: (213) 825-7685
NSI/DECnet: pdsppi::rwalker (node number 5.766 also uclasp::rwalker)
Internet: rwalker@pdsppi.igpp.ucla.edu (128.97.64.222)
Bitnet: rwalker@uclasp

or

Mr. Steven P. Joy
Institute of Geophysics and Planetary Physics
UCLA
Los Angeles, CA 90024-1567
USA
Telephone: (213) 206-6073
NSI/DECnet: pdsppi::sjoy (node number 5.766 also uclasp::sjoy)
Internet: sjoy@pdsppi.igpp.ucla.edu (128.97.64.222)
Bitnet: sjoy@uclasp

- b. **Dr. Raymond J. Walker**
Institute of Geophysics and Planetary Physics
UCLA
Los Angeles, CA 90024-1567
USA
Telephone: (213) 825-7685
NSI/DECnet: pdsppi::rwalker (node number 5.766 also uclasp::rwalker)
Internet: rwalker@pdsppi.igpp.ucla.edu (128.97.64.222)
Bitnet: rwalker@uclasp

3. Access procedures

- a. To reach the Planetary Plasma Interactive Node of PDS from NSI/DECnet, set host to PDSPPPI (node number 5.766) (also UCLASP) and sign in as PDSGUEST (no password is necessary). To reach PPI from the Internet the address is pdsppi.igpp.ucla.edu (128.97.64.222).
- b. PDSPPPI is available from either NSI/DECnet or Internet.
- c. Any computer terminal which emulates a DEC VT-100 and Tektronix 401x terminal can access PPI.
- d. No account is necessary.

4. System services provided

- a. The PPI Node will maintain access to catalog information from all planetary missions with instrumentation for planetary plasma physics investigations. The catalog contains detailed descriptions of the mission, the target (i.e., the planet, magnetosphere, or ionosphere) and the instruments on the mission. In addition, there is an inventory of all of the available data products from the mission. The inventory has a one hour granularity and contains information about data availability and its quality. The data quality entries include information about the types of contamination found in the data. The system also allows users to graphically browse through subsets of the data. The subsets are usually formed by averaging the data. Users may also order any part or all of the data from a given planetary encounter. The data will be delivered either electronically, on tape, or on CD-ROM (when available).

In addition to spacecraft data, the PPI Node provides users with models of planetary magnetic fields and results from computer simulations of planetary magnetospheres. Finally, the PPI Node provides users with state-of-the-art data analysis tools.

- b. The PPI Node contains data from planetary fields and particles experiments. These include but are not limited to magnetic field observations, plasma wave observations (electric and magnetic), plasma observations, energetic particle observations, radio astronomy observations, and radio occultation observations. Images of planetary aurora are also included. The first data in PDS were from the Voyager encounters at Jupiter, Saturn, and Uranus.
- c. All PPI services are available online. This includes using the facilities to browse data and to perform simple data analysis. Data ordering and delivery also can be done electronically.

- d. The PPI facilities are available to visiting scientists. In addition to the PPI online capabilities described, visiting scientists have access to a full suite of data analysis software. They also have access to SUN Microsystems SPARC workstations and facilities for making hard copies of their results (pen plotters, laser printers, etc.).
- e. Data can be delivered electronically, on magnetic tape, or on CD-ROM (for some data sets). All data deliveries are labelled by using PDS Labels which fully describe the contents of the data order. The browse system provides tabular as well as graphical output which may be captured from the terminal screen.

5. Ordering and pricing policy

Presently, all orders are filled free of charge. Large data orders are filled by the National Space Science Data Center (NSSDC), and those orders are subject to their pricing policy. The NSSDC maintains a copy of all PPI data holdings. Users are informed in advance if their order is too large for the PPI Node to fill directly.

6. Design and system architecture

- a. The PPI software suite consists of three major components. All are available as libraries. The first is a user interface library called SMAK (screens, menus, and keyboards). The second is a system to generate queries to a relational data base management system called create query (CQ). The third is an adaption to DEC VMS of the UCLA Data Flow System (DFS). DFS is a system used to analyze time series data and is used for the browse system. The entire system is described in *The Software Specifications Document for the Fields and Particles Discipline Node*.
- b. The system is based on a relational data base model. The code generated by CQ is in the Structured Query Language (SQL). Output data is available in two formats which both provide data tables (the UCLA Flat File System and the Interactive Data Language, IDL).
- c. The system will run on any DEC VAX VMS system with a relational data base management system which uses SQL. The system uses a client-server architecture in which the user interface and browse subsystem are detached from the data base. The client software can be moved to any VAX system that is networked to the data base. This greatly increases the response time of the system by using the network resources more efficiently.

7. Software available for distribution

- a. As noted above, the client part of the software can be moved to any networked VAX. In addition, the DFS system is available to users and can be run on any UNIX based workstation (see 9).
- b. The system requires a commercial data base management system. However, any system which supports SQL can be supported. One module in the system uses the Template graphics system. However, executable code for this module can be transferred freely.

8. System references and documentation

Software Specifications Document for the Fields and Particles Discipline Node.

Fields and Particles Node User's Guide.

9. Other systems

The Data Flow System (DFS) is a tool used to analyze time series data, which uses a data flow model. DFS, developed for UNIX workstations, is currently available for SUN SPARC workstations. DFS includes routines for most time series data analysis operations and displays. It also includes user interfaces for interactively combining analysis routines and a tool kit for generating new routines. DFS is available through the PPI Node of the Planetary Data System.

PDS Rings Node

November 25, 1991

1. Data system identification

- a. Planetary Data System (PDS) Rings Node
- b. Space Sciences Division
NASA/Ames Research Center
Moffett Field, CA 94035
USA

The PDS Rings Node is funded by NASA through JPL.

- c. The Rings Node was initiated as part of the PDS in 1990 to archive, catalog, and distribute all spacecraft-based data on planetary ring systems, along with many earth-based sets.
- d. When operational, the PDS Rings Node will provide data and cataloging services online, so that users may rapidly browse, select, and order data sets.
- e. Currently under development.

2. System contact information

- a. Dr. Mark R. Showalter
Mail Stop 245-3
NASA/Ames Research Center
Moffett Field, CA 94035
USA
Telephone: (415) 604-3382
NSI/DECnet: gal::showalter
Internet: showalter@galileo.arc.nasa.gov
- b. Same as 2a.

At present, no online system is available and no services are provided. Contact Dr. Showalter for further information.

3. Access procedures

None.

4. System services provided

None.

5. Ordering and pricing policy

None.

6. Design and system architecture

None.

7. Software available for distribution

The first component of a planetary rings software library is now available. The "Kepler" library consists of C functions for calculating the orbital motion of moons and rings within a planet's gravitational field. These routines may be incorporated into any C or FORTRAN program.

PDS Small Bodies Node

August 3, 1990

1. Data system identification

- a. Planetary Data System (PDS) Small Bodies Node (SBN)
- b. University of Maryland
College Park, MD 20742

PDS is funded by NASA through JPL.
- c. UMCP is a broadly-based state university emphasizing research and teaching in a wide variety of fields.
- d. To provide a live archive of data from spacecraft operated by the NASA Solar System Exploration Division and other data of interest to scientists studying the bodies of our planetary system.
- e. Under development.

2. System contact information

- a. Dr. Ed Grayzeck
Astronomy Program
University of Maryland
College Park, MD 20742
USA
Telephone: (301) 405-6076
HALLEY::GRAYZECK (or 6535::GRAYZECK)
Internet: grayzeck@astro.umd.edu

- b. Same as 2a.

At present, the node is under development. There are no online services, but data requests will be logged and filled for future reference.

3. Access procedures

- a. The system is a NSI/DECnet node (6535). The only function available is a utility for file copy, DNICP. After a data request is filled, the files can be electronically accessed via this procedure. For an explanation, contact the Node.
- b. Internet is the primary network.
- c. There is an anonymous account (PDS) available for the outside user.

4. System services provided

No system services provided.

5. Ordering and pricing policy

Data requests are accepted for future data products (e.g., the Comet Halley Archive on CD-ROM). Electronic or printed requests are logged using a standard PDS Request Form. Some large requests may be forwarded to the User Support Office of the NSSDC at NASA/GSFC.

6. Design and system architecture

Not operational.

7. Software available for distribution

No software available for distribution.

RAL
Geophysical Data Facility

May 23, 1990

1. Data system identification

- a. Rutherford Appleton Laboratory Geophysical Data Facility (RAL)
- b. Space Science Department
Rutherford Appleton Laboratory
Chilton
Didcot
Oxfordshire, OX11 0QX
United Kingdom

The Science and Engineering Research Council funds RAL.

- c. Space research and allied research.
- d. The purpose of Rutherford Appleton Laboratory Geophysical Facility is to provide information and data to support research in atmospheric science, space plasma science, and earth observation.
- e. RAL is operating and developing.

2. System contact information

- a. Dr. Lesley J. Gray
e-mail: AGVAX::LESLEY

or

Mr. D. R. (Chunkey) Lepine
e-mail: AGVAX::DRL

Space Science Department
Rutherford Appleton Laboratory
Chilton
Didcot
Oxfordshire, OX11 0QX
United Kingdom

- b. Dr. Paul H. G. Dickinson
e-mail: PHGD@UK.AC.RL.IB or AGVAX::PHGD
The address is the same as 2a.

3. Access procedures

- a. Through personal accounts on the GDF computer, or on another of the computers in the microVAX cluster.
- b. JANET (UK Joint Academic NETWORK).
- c. Terminals supported need to be anti-standard, (e.g., VT100, 200, etc.). Online supported graphics devices include Tektronics 4010/4014 and VAX workstations. Offline (hardcopy) is available as postscript files.

- d. Apply to Dr. Lesley Gray or D. R. Lepine (see 2a).

Currently, RAL is restricted to non-commercial users.

4. System services provided

- a. Data set catalogs, atmospheric science and STP data, space measurements, data from models, access to World Data Center C-1 (STP data).
- b. AMPTE-UKS, UCL 3DTD model, and WDC C-1.
- c. Online data retrieval, data transport, and data display (browse, graphics). Online relational data base handling using REXEC.
- d. Visitors welcome. Building R25 at RAL. Contact Dr. Gray or D. R. Lepine (see 2a).
- e. CCT, CD-ROM, optical disc, and tape cassette .

5. Ordering and pricing policy

No charges for data to academic users (please provide replacement discs, etc.)

Data restrictions are determined by the data set.

6. Design and system architecture

- a. Hardware: MicroVAX 3900 primary node with 20 platter, optical-disk jukebox serving as the main archive (40Gb).

Software: small, self-contained programs, written in VAX extended FORTRAN. Table-driven system operating in two stages: data retrieval and data processing to generate user output.

Data is archived in REXEC, CDF, native (e.g., binary), and text formats.

- b. R-EXEC (Rutherford Appleton Laboratory) Relational DBMS
- c. R-EXEC is implemented on IBM 3090-600E and MicroVAX.

7. Software available for distribution

None as yet.

8. System references and documentation

GDF User Guide.

9. Other systems

WDC C-1 Contact Dr. D. M. Willis at the address in section 1b.

SMM DAC

July 20, 1990

1. Data system information

a. Solar Maximum Mission Data Analysis Center (SMM DAC)

b. SMM Project (Orbiting Satellites Project)
Code 602
NASA Goddard Space Flight Center
Greenbelt MD 20771
USA

The SMM project is funded by NASA.

- c. The Orbiting Satellites Project manages science and operations support for operating spacecraft, and continues to provide management support for missions funded in the post-operations analysis phase.
- d. The SMM DAC acts as a distributed data center for the NSSDC by providing online access to SMM science data, ancillary ground-based data sets, software for reducing and analyzing these data, and catalogs of SMM and related data sets.
- e. The SMM DAC is operating, but complete archiving of the SMM science data will not be complete until the end of 1990; ancillary ground-based data sets will be archived in 1991. PI group members at the DAC continue to refine SMM software for easier use and portability. It is hoped that continued funding will allow the DAC to become a solar physics discipline data center (DDC).

2. System contact information

a. Dr. Joseph B. Gurman, Facility Scientist
SMM Data Analysis Center
7474 Greenway Center Drive
Suite 500
Greenbelt, MD 20770
USA

NSI/DECnet: SOLMAX::GURMAN

b. Same as 2a.

3. Access procedures

a. Online access

i. Via NSI/DECnet:
\$ set host solmax
Log in to individual user or SMM experiment account.

ii. Via phone:
Dial in to SMM DAC 2400 baud modem lines (numbers available by request).
Proceed as above.

b. Primary network: NSI/DECnet. A TCP/IP Internet node will be available in the last quarter of 1990.

- c. VT compatibles (including PC and Mac emulators)
Tektronix 4010/4014 compatibles (including emulations)
X windows
- d. Contact the facility scientist at the address or phone number in 2a. Users will be provided with individual accounts if needed, or sufficient network proxy capability to access data remotely if that is the extent of their use. The SMM data set is available to any qualified solar physicist or researcher in a related area.

4. System services provided

- a. Available data:

- i. SMM Science Data

By the end of 1990, the final data archives for each of the seven SMM science experiments will be available on archive storage media (WORM disks, 8 mm tape cassettes, and 4 mm DAT cassettes). User requests for online access to any of these data will generally be met within a one-hour period during normal working hours (8 AM-6 PM local time); larger requests will be shipped to the investigator's home institution after the copy media is provided. Transfer of smaller data sets to different media also can be performed.

- ii. Ground-based Data

National Solar Observatory magnetograms for the periods of pointed observation of SMM (February 14, 1980 - November 22, 1980, and April 21, 1984 - November 27, 1989) will be available on the same basis as SMM science data. USAF Solar Optical Observing Network (SOON) H α and magnetic field data for selected active regions will be available offline.

- iii. Catalogs

The SMM Event Listing, including SMM and ground-based optical and radio listings, for 1980-1989 will be available online, as will be instrument-specific catalog of observations for several of the SMM experiments (currently, HXRBS, UVSP, and C/P). Menu-driven software will be available for interrogating these catalogs.

- b. In addition to those catalogs described in 4a.iii, the SMM data analysis center data set consists of SMM observations of total solar irradiance (ACRIM), γ -ray continua and nuclear line transitions (GRS), continuous, hard X-ray Bremsstrahlung emission (HXRBS), thermal hard X-ray continuum emission (HXIS), soft X-ray line and continuum emission (XRP), ultraviolet (uv) absorption and emission line, continuum radiation (UVSP), and white-light electron scattering (C/P). The great majority, but not all, of this electromagnetic radiation is from the sun; small but important parts of the SMM data set represent cosmic bursters, galactic-plane ray line sources, supernovae, comets, and other stars. In addition, a large fraction of the UVSP data set consists of measurements of occultations of the sun by the Earth's atmosphere that can be used to derive ozone concentrations in the terrestrial mesosphere. The ACRIM data are a time series; GRS, HXRBS, XRP, and UVSP observations include spectrally resolved data (in the case of the last two instruments, of very high resolution), and the HXIS, XRP, UVSP, and C/P data sets include images.
 - c. Online services currently include catalog browse and interrogation, as well as a wide variety of instrument-specific spectrum and image display and analysis software.

Plans for FY91 include the implementation of an AI-based data access package for inexperienced users.

- d. All qualified users are welcome at the DAC, which does not require special handling for foreign visitors in its current location. All visitors, however, should contact the facility scientist before planning their trips.
- e. Supported media include, but are not necessarily limited to:
 - 14-inch Optimum WORM disks
 - 800, 1600, and 6250 bpi 0.5-inch magnetic tapes
 - 8 mm, 2.3 Gbyte Exabyte tape cassettes
 - 4 mm, DDS format DAT tape cassettes
 - 5.25-inch Sony erasable optical disks for Macintosh
 - 5.25-inch floppy diskettes for PCs
 - 3.5-inch floppy diskettes for PC and Macintosh
 - VAXstation systems

5. Ordering and pricing policy

All data requests will be handled on a case-by-case basis. Based on past experience (i.e., while SMM was still operating), most data will come to the PI groups. Starting in 1991, we will copy moderate amounts of data to the supported medium of the user's choice when the user provides the media. ("Moderate" will be determined by the capacity, manpower, and resources required for supporting the particular medium.) Larger requests will be referred to the NSSDC, pending approval of the MOU currently under discussion.

6. Design and system architecture

- a. The SMM DAC does not represent a single integrated software system, but most PI teams have written extensive data display and analysis libraries in the Interactive Data Language (IDL) from Research Systems, Inc. IDL runs on the following systems on the DAC LAN:
 - VAX 8350
 - VAX 11/750 (to be upgraded to a MicroVAX 3400)
 - MicroVAX 3400, a VAXstation II/GPX (to be upgraded to a VAXstation III)
 - VAXstation 2000, three VAXstation 3100s
 - UNIX compatible, RISC workstation on order

IDL V2 allows portability of code between VAX and RISC-based systems. A smaller body of PI provided code (written in VAX FORTRAN) runs only under VMS.

- b. Each data set has an individual format, although some of the IDL software makes these formats transparent for the user who is uninterested in such details.
- c. Current plans call for porting all of IDL V1 (VMS-specific) software to IDL V2, which should by then be available for VMS, Ultrix, and a variety of RISC platforms (UNIX, SUN, HP, Silicon Graphics, etc.). VMS-specific executable code will be ported to a POSIX-compatible platform as time and personnel availability allows in FY91.

7. Software available for distribution

- a. See 6a. Users should contact the facility scientist or SMM PIs for more details.
- b. See 6a. IDL can be licensed directly from RSI or from Precision Visuals (also of Boulder, Colorado).

8. References and documentation

Scientists interested in using SMM observations, and who have not done so before, should consult the series of articles in *Solar Physics*, 65 (1980) that describe the individual instruments. Characteristic samples of data and their use are described in the management document *NASA's Solar Maximum Mission: A Look at a New Sun*, J. B. Gurman, ed. (NASA Goddard Space Flight Center, 1987). The DAC Users' Guide published in 1983 is now almost completely obsolete. We currently plan to have a new User's Guide available by the end of FY91.

MAX '91

August 10, 1990

1. Data system identification

- a. Max '91 Solar Information System
- b. INOAA Space Environment Laboratory
R/E/SE
325 Broadway
Boulder, CO 80303
USA

This data system is supported by NOAA. The Max '91 program for coordinated observations of solar activity is funded by NASA and NSF.

- c. The purpose of the system is to provide observatories and scientists with reports of solar activity, active regions and plots of solar x-ray fluxes to aid in planning solar flare observations worldwide. The information is updated daily and is used for coordinated flare observing campaigns as well as daily routine observations of solar active regions. In addition to flare and region reports, copies of campaign announcements, newsletters, and campaign action notices are stored on the account.

NOAA's Space Environment Laboratory (SEL) actively collects, organizes, stores, and redistributes over 1,400 different types of solar-terrestrial data continuously. The Max '91 Solar Information System receives a small fraction of that data (some of the data has been especially reformatted for the Max '91 account) and renders it available over the NSI/DECnet, Internet, and telephone systems.

- d. The Max '91 Solar Information System is intended to enhance and simplify observatory planning of large-scale collaborative research campaigns. However, it is used by a variety of scientists for other purposes than solar flare observations.
- e. The system is operating with continuing development.

2. System contact information

- a. Mr. Jim Winkelman
NOAA/SEL
R/E/SE
325 Broadway
Boulder, CO 80303
USA
Telephone: (303) 497-3283
NSI/DECnet: 9555::SYSTEM

- b. Dr. Alan L. Kiplinger (Max '91 Coordinator)
NOAA/SEL
R/E/SE
325 Broadway
Boulder, CO 80303
USA
Telephone: (303) 497-5892
NSI/DECnet: 9555::AKIPLINGER

3. Access procedures

A personal account on the NOAA computer SELVAX is not required since the data base is open to outside reading.

a. To reach the system

i. On the NSI/DECnet network:

enter SET DEFAULT 9555::SYS\$USERROOT:[MAX91]

Type READ.ME for file information (a special file maintained to explain the files stored on the account.)

ii. On Internet:

Users may login to the MAXT account (a mnemonic for MAX '91 and Telnet). No password is required. This is a highly restrictive account that only allows the reading of files.

To access the account type:

telnet 132.163.224.10

The system should respond with a USERNAME: request. When this occurs, type MAXT. To terminate the session type LOGOFF.

Once logged in, the user is using VAX-VMS but may type HELP or type the READ.ME file for further information.

iii. On the telephone:

Users may dial 303-497-3215 at 1200/2400 baud and login to the MAXT account the same account used for Internet. NSI/DECnet users should not use the MAXT account.

b. The primary access networks are NSI/DECnet and Internet.

c. Terminals supported include VT100, VT200, and Tektronix 4010. To receive plots, Tektronix 4010 capability is required.

d. No special account is needed.

4. System services provided

- a. Daily event listings are available online (flare reports compiled by NOAA solar forecasters on a daily basis), solar activity reports (which include particle events as well as flares), region reports (which describe solar active regions), GOES soft x-ray plots (4 six-hour plots per day), and a solar coronal report (when available).

- b. More information on the data sets is presented in the READ.ME file on the account.
- c. Since this is a read only account, no services are provided. The ability to execute files is not provided.
- d. The use of the data base is currently unrestricted and is open to scientists worldwide.
- e. Media distribution is not supported. It is assumed that any data set desired can be copied at the user's terminal.

5. Ordering and pricing policy

There are no costs for using the system.

6. Design or system architecture

- a. The Max '91 Solar Information System runs on a MicroVAX-II under VAX-VMS version 5.2.
- b. There is no specific data format except for the GOES plots that are formatted for Tektronix terminals. All data is ASCII.
- c. All files may be easily copied and transported.

7. Software available for distribution

- a. A special file for automatically copying files daily may be copied to operate under VAX-VMS. The file is called MAX91.COM and is described in the READ.ME file.
- b. No commercial software is available or needed by this system.

8. System references and documentation

The system is described in the READ.ME file and upgrades to the system are published in the Max '91 Newsletter, *Maxfacts*, available from the coordinator.

9. Other systems

A parallel account (SESC) has recently been developed by NOAA/SEL. The account holds a variety of other solar as well as geophysical and interplanetary data sets. Its use and operation is entirely analogous to the Max '91 account.

Contact:

Mr. Bill O'Clock
NOAA/SEL
R/E/SE
325 Broadway
Boulder, CO 80303
USA
Telephone: (303) 497-6498
NSI/DECnet: ::SYSTEM



SELDADS

July 19, 1990

1. Data system identification

- a. Space Environment Laboratory Data Acquisition and Display System II (SELDADS)
- b. National Oceanic Atmospheric Administration (NOAA) through the Space Environment Laboratory Space Environment Services Center and the United States Air Force

R/E/SE2
325 Broadway
Boulder, CO 80303
USA
- c. The purpose of the Space Environment Services Center is to provide summaries, indices, alerts, and forecasts to users whose activities are affected by variations in the solar-terrestrial environment. The Space Environment Lab, in addition, is to conduct research in solar-terrestrial physics and develop techniques to improve the monitoring and forecasting of the space environment.
- d. SELDADS is dedicated to acquiring, processing, and displaying solar-geophysical data in real-time, primarily in support of The Space Environment Services Center (SESC) and the U.S. Air Force Global Weather Central (AFGWC). Data and products are provided to a user community engaging in national defense, satellite operations, aviation, electric power distribution, communications, geophysical exploration, pipeline operations, and a variety of scientific studies.
- e. Operational, maintained 24 hours a day.

2. System contact information

- a. J. D. Schroeder III (Dean)
System Manager
NOAA/ERL R/E/SE2
325 Broadway
Boulder, CO 80303
USA
Telephone: (303) 497-3780 (FT5) 320-3780
- b. Rita Brown
NOAA/ERL R/E/SE2
325 Broadway
Boulder, CO 80303
USA
Telephone: (303) 497-5828 (FT5) 320-5828

3. Access procedures

a-d. Accessing SELDADS

Users need a terminal and modem set up with the following configuration:

- 300 or 1200 baud (bits per second)
- 8 bits/character
- No parity
- Full Duplex

Space Environment Services Center (SESC)
Space Environment Laboratory
National Oceanic and Atmospheric Administration (NOAA)
(SESC is a joint operation of NOAA and the United States Air Force Weather Service.)

Dial the appropriate number for your baud rate:

1200	303-497-5800	(FTS 320-5800)
	303-497-5623	(FTS 320-5623)
300	303-497-5624	(FTS 320-5624)
	303-497-5616	(FTS 320-5616)

When the connection is made, the following should appear on your terminal.

****NOAA SELDADS II-ADS/VIS X.XX.XX /Press NEW-LINE to begin logging on****

- e. This message may be garbled, particularly at 1200 baud.

To obtain a username and password, contact the System Manager.

4. System services provided

- a. The SELDADS outside User System is a menu driven display which lists and slots user selected data and products.

USER-MENU

01) ENVIRONMENT.MENU	02) FCSTS ALERTS.MENU
03) UTILITIESxMENU	04) SUMMARIES.MENU
05) DATA_LISTS.MENU	06) DATA_PLOTS.MENU

(Execute/Help/Quick/Main) (Menu entry)

- | | |
|-----------------------|---|
| b. SESC Text Products | Five daily products created and issued by SESC. |
| GWC Text Products | Six daily products created and issued by GWC. |
| Other Text Reports | 14 daily worldwide reports and other coded messages containing events, data, and indices. |
| SESC Forecasts | Daily forecasts issued by SESC. |
| Events Data Sets | X-ray and solar radio burst events. |
| X-rays | One and five minute values from GOES 6 and 7 for two channels 0.5-4 and 1-8 angstroms. |

Radio Flux	Daily radio flux values at 19 frequencies from 11 stations around the world.
Proton data	Proton data from GOES and NOAA satellites at a wide range of energies and time intervals.
Alpha data	Alpha particle data from GOES satellites.
Electron data	Electron data from GOES and NOAA satellites.
Ionospheric Total Election Content	Total Electron Content data from 10 stations.
Magnetometer data	A- and K-indices, plus one and five minute magnetometer readings from as many as 30 stations and satellites.
Riometer and Neutron Monitor	One and five minute Riometer data from 20 stations, plus other riometer and neutron monitor data.
Ionosphere	foF2, FMIN, FOES, M3000, and HF data from as many as 40 stations around the world.
Miscellaneous	Miscellaneous data such as station locations

c. Online Services

1. Satellite Broadcast

Description:	The SESC Satellite Broadcast allows customers to receive solar and geophysical data via a small satellite receiving station. This enables customers to collect SESC data on a printer, video terminal, or any microcomputer for individual use. The Satellite Broadcast provides real-time data on a continuing basis throughout the continental U. S., Canada, Alaska, and Hawaii. SESC also has IBM-style PC software to display the data in eight different formats.
Begin/End Dates:	The Satellite Broadcast contains the most recent data from SELDADS. The data types and the length of time that the data are available varies.
Maintenance:	This is an operational system maintained 24 hours a day, seven days a week.
Medium:	The satellite receiving station is a microstation consisting of a small (two ft diameter) antenna and portable controller. The controller can be connected to a printer, video terminal, or any micro-computer of choice. Customers must purchase or lease their own equipment. The receiving station is currently available for \$2,600.
Data Quality:	This is a subset of SELDADS data.
Further information:	Contact SESC for more information about the data and receiving the Satellite Broadcast. The PC software is available at no cost.

Satellite Broadcast Menu

1. Boulder and Planetary Geomagnetic Data
2. Geosynchronous Geomagnetic Data
3. Forecasts, Warnings, and Alerts
4. Ionospheric Data (TEC & foF2)
5. Daily Solar Indices
6. (not currently used)
7. GOES X-ray Plot
8. Boulder Magnetometer Plot with Quiet Day Curve

ii. Public Bulletin Board System

- Description:** SESC provides a PC-based Public Bulletin Board System (PBBS) for customers to access the latest SESC products and data quickly and easily.
- Begin/End Dates:** The PBBS contains the most recent products from SELDADS. The time periods that the data are available varies—see the descriptions in section 4b.
- Maintenance:** The system is available 24 hours a day, seven days a week, but it is maintained only during normal working hours. Therefore if the system goes down during off-hours it is not restarted until some time later.
- Medium:** This data is obtained via modem from a dial-up PC in SESC.
- Further information:** Contact SESC for more information about the bulletin board or access the PBBS directly. The data protocol is 8-bit data with 1 stop bit and no parity. The PBBS will prompt you for the required initial information and lead you to the Main Menu. Telephone numbers are: (303) 497-5000 for 300, 1200, or 2400 baud.

Main Menu

- | | |
|--------------------|-----------------------|
| P) ropagation | O) ther SESC Products |
| S) olar Report | C) omments to Sysop |
| R) egion Report | U) ser Records |
| A) ctivity Summary | H) elp Menu |
| Q) uick Look Data | N) ews |
| D) ata Listings | I) nformation on SESC |
| M) UF Predictions | B) ye (Leave System) |

(P, S, R, A, Q, D, M, O, C, U, H, N, I, B) Choice? __

iii. Electronic File Transfer

- Description:** SESC maintains files of the daily products, flare listings, and x-ray data plots that are accessible through our VAX computer system. SESC does not transmit data to users; rather, the user can logon and transfer data via various network file transfer techniques.
- Update time:** The messages and data are updated daily at 0300 local time from the SELDADS.
- Period covered:** Text products are kept online for five days. Plots and flare lists are kept for the previous 30 days.
- Maintenance:** The system is available 24 hours a day, seven days a week, but is maintained only during normal working hours.
- Medium:** NSI/DECnet—two ways to access files. Note: SELVAX:: is the same as 9555::

1. SET HOST SELVAX

login with username SEL (no password required)
TYPE filename_desired

2. COPY SELVAX::SEL\$SEL:filename_desired *.*

Internet—two ways to access files.

1. telnet selvaxsel.bldrdocxgov or telnet 132.163.224.10

login with username SEL (no password required)
(VMS commands must be used)
TYPE filename_desired

2. ftp selvax.sel.bldrdoc.gov or ftp 132.163x224.10

login: username SEL (no password required) get filename
desired

Telephone (303) 497-3215 (1200 or 2400 baud)
login with username SEL (no password required)
TYPE filename desired

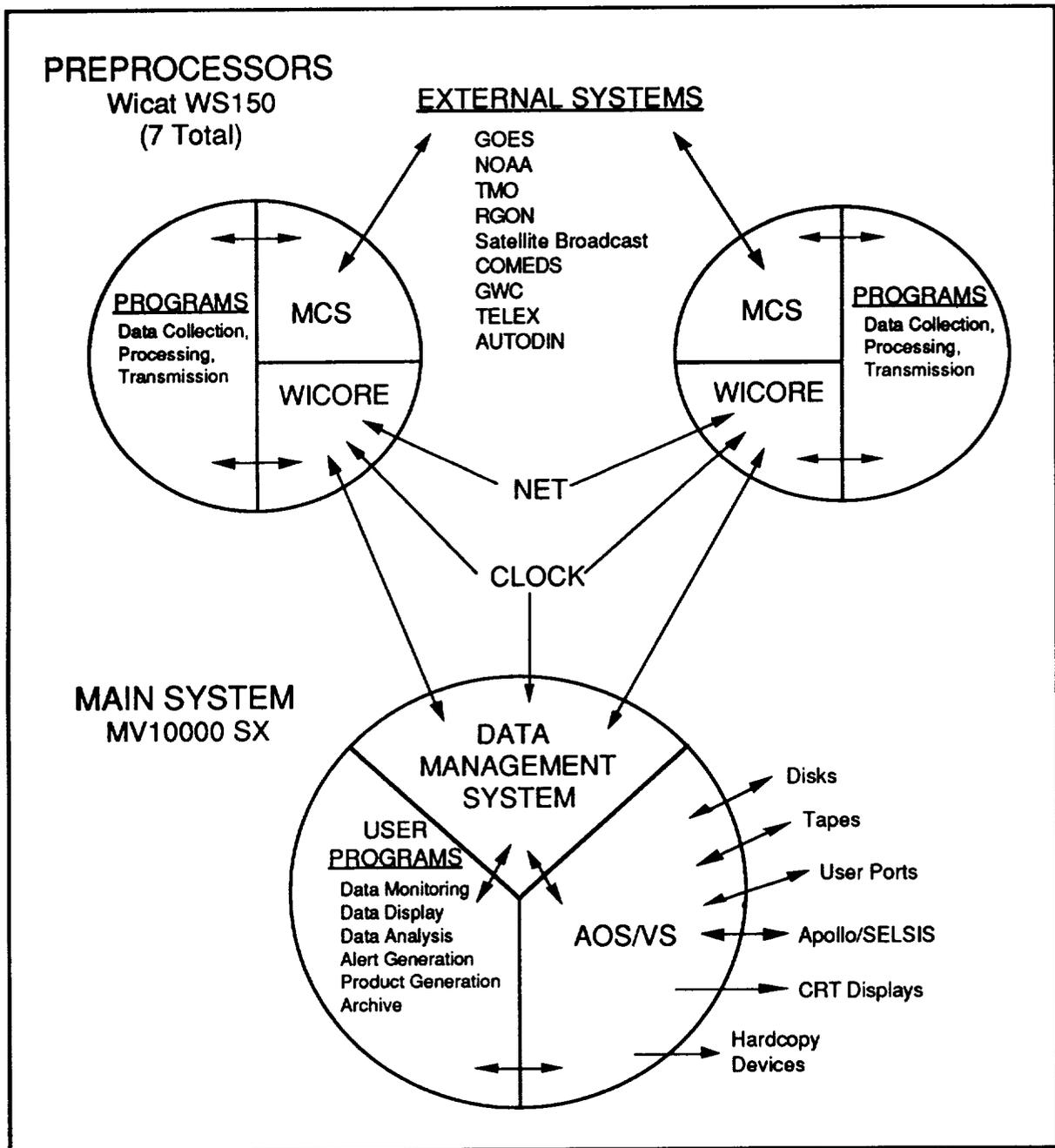
Further information: There is a READ.ME file in these accounts that describes the files available and gives complete instructions for transferring data and products. Please contact SESC for further assistance or information.

- d. Scientists invited as visitors by the Space Environment Laboratory may use laboratory facilities to get data from SELDADS.
- e. Data is archived with the National Geophysical Data Center (NGDC) in Boulder, Colorado, Telephone: (303) 497-6136.

5. Ordering and pricing policy

Users pay the communications costs necessary to reach the data base.

6. Design and system architecture



- SELDADS II system design and functions (see figure).
- The data management system is a custom system designed specifically for SELDADS.
- Not Applicable.

7. Software available for distribution

Not available.

8. System references and documentation

Space Environment Laboratory Data Acquisition and Display System II, NOAA Technical Memorandum ERL SEL-76.

SELDADS User Manual—available from the System Manager.

SELSIS

July 19, 1990

1. Data system identification

- a. The Space Environment Laboratory Solar Imaging System (SELSIS)
- b. The National Oceanic Atmospheric Administration (NOAA) through the Space Environment Laboratory Space Environment Laboratory Space Environment Services Center and the United States Air Force

R/E/SE2
325 Broadway
Boulder, CO 80303
USA

- c. Understand and protect against the detrimental effects of disturbances in the solar-terrestrial environment. SESC now functions like a weather service, but is concerned with space environment.
- d. SELSIS provides near real-time solar images to SEL and the USAF Space Forecast Center (SFC) for use in their operational solar forecast centers, the Space Environment Lab (SEL) research group, and the National Geophysical Data Center (NGDC) for archival and distribution to other potential users.
- e. Operational.

2. System contact information

- a. Larry Combs, System Manager
NOAA/ERL/R/E/5E2
325 Broadway
Boulder, CO 80303
USA
Telephone: (303) 497-5299

- b. Rita Brown
NOAA/ERL R/E/SE2
325 Broadway
Boulder, CO 80303
USA
Telephone: (303) 497-5828 (FTS) 320-5828

3. Access procedures

SELSIS images are available on the SELVAX computer over the NSI/DECnet or Internet networks.

NSI/DECnet address: SELVAX:: OR 9555::COPY SELVAX::SEL\$IMAGE: filename.

Internet:

telnet selvax.sel.bldrdoc.gov or telnet 132.163.244.10

or

ftp selvax.sel.bldrdoc.gov or ftp 132.163.224.10

login with username IMAGE (no password required).
get filename.

4. System services provided

- a-c. SELSIS is the Space Environment Laboratory Solar Image System. SELSIS is a data base of solar images in digital format which are used by the SESC forecasters and also are made available to SESC customers via a computer network. SESC receives, processes, and stores solar images from five observatories. Images are full-disk and large-scale, Hydrogen-alpha white-light, Calcium II, Helium 10830, and magnetograms.

SELSIS observing stations:

SESC Solar Observatory, Boulder, Colorado, USA
Holloman AFB, New Mexico, USA
Kitt Peak National Observatory, Tucson, Arizona, USA
Learmouth Solar Observatory, North Cape, Australia
Sacramento Peak Solar Observatory, Sunspot, New Mexico, USA

Period Covered: Images are received throughout the day and are available on the VAX at roughly these times:

Learmonth	0930 UT
Holloman	0200, 1430, & 2000 UT
Boulder H-alpha	1600 UT
Kitt Peak	1900 UT
Sacramento peak	2100 UT

- d. Scientists invited as visitors by the Space Environment Laboratory may use laboratory facilities to get data from SELSIS.

5. Ordering and pricing policy

Users pay the communications costs necessary to reach the data base.

6. Design and system architecture

SELSIS images are 512 x 512 bytes, where the first line is 128 bytes of ASCII header information plus 384 bytes of blank fill.

The IMAGE account has a text file, directory.lis, with a list of the images currently available.

The image filename is made up of the image's date/time and observatory. The format is:

`iyymmddhhmssob x span or iyymmddhhmssob-span-z`

where

yy	2 digit year
mm	2 digit month
dd	2 digit day
hh	2 digit hour
mm	2 digit minute
ss	2 digit second
ob	2 digit observatory code

. `span` indicates files are the 512x512 byte files
. `span_z` indicates files in compressed format.

Contact Jim Winkelman (SELVAX: : SYSTEM) for the VAX decompression algorithm.

7. Software available for distribution

Not available.

UCLASSC

November 25, 1991

1. Data system identification

- a. University of California at Los Angeles, Space Science Center (UCLASSC)
- b. University of California at Los Angeles
Institute of Geophysics and Planetary Physics
3845 Slichter Hall
Los Angeles, CA 90024-1567
USA

The UCLASSC is funded primarily by NASA. NSF and the State of California also provide funding.

- c. The UCLASSC was established in 1962 to study the physics of planets with an emphasis on the Earth's magnetic field and on solar-terrestrial interactions.
- d. The UCLASSC maintains a catalog of magnetic field sensor records from several spacecraft to facilitate research by scientists within UCLA and throughout the scientific community.
- e. The UCLASSC data access and analysis systems are operating and continually evolving.

2. System contact information

- | | | |
|-----------------------|--------------|----------------------|
| a. Mr. Harry Herbert | or | Ms. Muriel Kniffin |
| BRUNET::HARRY | (NSI/DECnet) | BRUNET::MURIEL |
| HARRY@BRUNET | (BITNET) | MURIEL@BRUNET |
| herbert@igpp.ucla.edu | (INTERNET) | muriel@igpp.ucla.edu |
| (310) 825-9030 | (TELEPHONE) | (310) 206-9955 |

UCLA - Institute of Geophysics and Planetary Physics
5833 Slichter Hall
Los Angeles, CA 90024-1567

- b. Harry Herbert (see section 2a).

3. Access procedures

- a. The UCLASSC may be accessed via the NSI/DECnet and INTERNET networks or through direct dial. The host computer is a MicroVAX II with the node name BRUNET.

NSI/DECnet access: SET HOST BRUNET

Internet access: telnet brunet.igpp.ucla.edu

Modem access: (310) 825-0229 (1200/2400 baud, 7 bits, no parity)

Users may make data requests by logging into the REQUEST account (password REQUEST) and answering the questions. Interactive users may log into the GUEST account (password UCLA) to review various online data sets. It is strongly recommended that new interactive users first contact one of the user support contacts before logging on to learn what data sets are currently available and what facilities are available to examine these data sets.

- b. The primary networks for access are NSI/DECnet and Internet.
- c. The REQUEST account's interface will function properly with any text terminal. The GUEST account is a complete VMS user account where many facilities work best with VT compatible terminals. Graphics programs support DEC graphics terminals, HP graphics terminals, and Tektronix 4014.
- d. No individual accounts are necessary because the GUEST account gives full access to the system.

4. System services provided

- a. The following types of data are available from the UCLASSC:

- i. ISEE-1 and ISEE-2 magnetic field and ephemeris data

The UCLASSC performed the primary data processing for the fluxgate magnetometer aboard these spacecraft and thus has data available in a variety of time resolutions and coordinate systems from launch on October 22, 1977 through re-entry on September 26, 1987. Most data are stored on magnetic tapes and may be restored to magnetic disk for requested time intervals.

- ii. AMPTE-UKS magnetic field and ephemeris data

The UCLASSC has a complete catalog of data from the fluxgate magnetometer on board this spacecraft. The time intervals covered are from August 1984 through January 1985. These data are also stored on magnetic tape and selected intervals may be restored to magnetic disk upon request.

- iii. IMP-8 magnetic field, plasma, and ephemeris data

The UCLASSC has acquired from the NSSDC a large amount of data from the IMP-8 spacecraft which outside researchers may access. Higher resolution data are stored on magnetic tape and may be retrieved for requested time intervals. Low resolution data is available online. Currently, data are available from October 30, 1973 through February 7, 1986.

- iv. ISEE-3 magnetic field, plasma, and ephemeris data

The UCLASSC has acquired ISEE-3 data pool magnetic field and ephemeris data from August 1978 through November 1985. Also, available are plasma parameters from August 1978 through February 1980. Most data are stored on magnetic tapes and may be retrieved for selected time intervals; however, low resolution data from the interval August 1978 through February 1980 is available online.

- b. The following ST-relevant data sets are available from the UCLASSC:

- i. ISEE-1 and ISEE-2 magnetic field and ephemeris data

Magnetic field data for the entire mission of both spacecraft is available on magnetic tape at resolutions of 64 seconds, 4 seconds (12 second averages), and high resolution (0.25 or 0.0625 seconds). The data may be averaged to other time resolutions upon request. Standard deviations of the averaging process are also available. Data are stored in spacecraft coordinates but may be rotated into GSE, GSM, or dipole coordinates. Model field data are also available for the ISEE time period. Additionally, ephemeris data, taken every 60 seconds, are available on magnetic tape.

ii. AMPTE-UKS magnetic field and ephemeris data

Magnetic field and ephemeris data for this spacecraft are stored on magnetic tape in the same manner as for the ISEE-1 and ISEE-2 data described in section 4b.i.

iii. IMP-8 magnetic field, plasma, and ephemeris data

Magnetic field and position data are stored on magnetic tape for the higher resolution 15.36 second data. Magnetic field, plasma, and ephemeris data are available online at five minute resolution in the file DISK\$DATA:[IMP]IMP8.FFH

iv. ISEE-3 magnetic field, plasma, and ephemeris data

Magnetic field and position data are stored on magnetic tape for the 64-second data pool data. Magnetic field, plasma, and ephemeris data are available online at five minute resolution in the file DISK\$DATA:[ISEE]ISEE3SW.FFH.

c. Services are available for requesting data (the REQUEST account) and software is available to review and analyze the data:

- i. The FL (File Lister) program permits browsing through time series data files. It functions much like an editor to allow the user to move freely through a file and to view the data both numerically and graphically. This program may be used to browse all time series data files created at the UCLASSC.
 - ii. The BANAL (B-field ANALysis) program provides graphical display and analysis of time series magnetic field data including filtering, detrending, power spectra, and hodograms.
 - iii. The TANAL (Trajectory ANALysis) program provides graphical display and analysis of time series magnetic data that takes into account spacecraft position and allows comparisons with model field data.
 - iv. The ICIMPSW (ISEE-3/IMP-8 Solar Wind) program permits browsing through the ISEE-3 and IMP-8 five minute resolution files described in section 4a and 4b.
 - v. There are a number of additional programs to manipulate data files that have been stored in the UCLA-IGPP flat file data format (see section 6a for a description of this format). These include programs to average data, rotate data, perform algebraic calculations on data, filter out bad points from data and to convert data between VAX/VMS format and UNIX format.
- d. Information concerning availability of facilities for visiting scientists is available through the main office of the UCLA Institute of Geophysics and Planetary Physics; see section 1b for its address.
- e. Data sets smaller than two megabytes may be transmitted via electronic networks (NSI/DECnet, BITNET, or Internet) if a requester so desires. Otherwise, data are typically supplied on nine-track magnetic tape. Some data plots and numeric listings are also available on microfiche; please see the REQUEST account information files for details.

5. Ordering and pricing policy

The UCLASSC supports the general space physics and geophysics research community, but does not provide data or services for commercial use. There is currently no charge for data requests.

6. Design and system architecture

- a. The UCLASSC currently operates from a DEC MicroVAX II which runs the VMS operating system. The REQUEST account uses a menu interface command file written in the VMS command language. The GUEST account is a full service VMS account that provides access to the UCLASSC data review and analysis software. To view a list of available programs and what they do, enter the command PRUN at the system prompt. To execute a program, enter the command PRUN PROGRAM_NAME at the system prompt.

There are two main software packages used by the UCLASSC. The first is the UCLA-IGPP flat file subroutine library, which consists of two companion files. First, an ASCII header file, called *.FFH, which describes the data, including the name of the data column, coordinate system, source, resolution start and stop time of the data set, and an abstract, which provides any additional information needed to describe the data set. Second, a BINARY data file, called *.FFD, containing the data values described in the header file.

The second software package is the graphics package Template, a commercial subroutine library from the company TGS, Inc. Template allows the development of device-independent graphics programs that interface with a variety of graphical device drivers also developed by TGS.

- b. The UCLASSC stores its data using the UCLA-IGPP flat file format described in section 6a.
- c. The UCLASSC software may be run on any DEC VAX/VMS system with a Template software license. Additionally, the UCLA-IGPP flat file system and the UCLASSC review and analysis programs have been ported to Hewlett-Packard's HP-UX UNIX operating system and to SUN Microsystem's SunOS UNIX operating system. Both UNIX systems also require a Template software license.

7. Software available for distribution

- a. The UCLA-IGPP flat file subroutine library and the programs for data review and analysis described in section 4c are available for distribution for the following operating systems: DEC's VAX/VMS, Hewlett-Packard's HP-UX, and SUN Microsystem's SunOS.
- b. The Template graphics subroutine library from TGS, Inc. is required to use any program with graphical capabilities.

8. System references and documentation

Online help for the UCLASSC programs and subroutine libraries is available via the VMS HELP utility on the host computer (BRUNET) by entering the command HELP FLAT. Also, a list of available programs with a one line description of their functions may be viewed by entering the command PRUN.

9. Other systems

A project has been completed to port all software and a number of data bases to a network of SUN SPARCstations. These systems provide considerably faster computer throughput for all data review and analysis programs. Graphical output support will continue to be provided by the Template subroutine library, but with the addition of SUNVIEW and X windows. GUEST and REQUEST accounts will be provided for these systems during the first half of 1992.

IV. Network to Network Communications

Network-to-Network Communications

As electronic communications networks and gateways among the different networks have become more common, it is increasingly feasible literally to reach around the world to exchange electronic mail or to access relevant solar-terrestrial data systems.

For each of the data systems referenced previously in this handbook, only the address and access information for those networks **to which a given system is directly connected** have been shown. Users with direct access to an appropriate network would then use the ordinary procedures and syntax of that network to access the desired system.

The purpose of this section is to outline the primary (current) procedures by which system access and file/mail transfers can be achieved across network boundaries where such direct connections do not exist, using existing gateway and other facilities. The discussion is a summary and simplified overview only: the various Network Information Centers, network publications, and the networking references cited all contain substantially more complete and possibly more current information on these topics.

This section is divided into four parts:

I. A Summary of Networks

A brief summary of the major networks worldwide that carry solar-terrestrial science related communications traffic, including summary annotations of the various subnets transparently connected within these larger frameworks.

The groupings herein and the subsequent detailed information are organized from a user perspective, rather than from any sponsoring agency or other political or administrative model.

II. Network-to-network paths for:

- data system access (remote logins)
- file transfers
- exchange of electronic mail

III. Network Information Centers

IV. Networking References

I. A Summary of Networks

Electronic networks are distinguished by a variety of features, including their underlying communications protocol(s), addressing schema, and the physical connections among network nodes. Some relevant networks to the solar-terrestrial research community include:

a. DECnet Internet:

A worldwide internetwork based on the Digital Equipment Corporation's DECnet protocols. The various networks that are a part of the DECnet Internet include:

- (former) SPAN (Space Physics Analysis Network)
NSI/DECnet
E-SPAN (European SPAN)
DAN (Data Acquisition Network-Canada)
- (former) HEPnet (High-Energy Physics network)
ESnet/DECnet (DOE Energy Science network)
E-HEPnet (European HEPnet)
- THEnet (Texas Higher Educational network)
- other project-dedicated and private networks (e.g., UARSnet)

DECnet addresses (for mail, file transfers/copy or remote logons/set host) are generally of the form:

DECnet_HOST::DECnet_ACCOUNT

where DECnet_HOST may be either a node name of ≤ 6 alphanumeric characters or an "integer" address of ≤ 5 digits. The underlying DECnet node addressing (Phase IV) is ultimately numerical and in a "decimal" form constructed from an "Area_Number" (range 1-64) and "Node_Number" (range 1-1024) as:

Area_Number . Node_Number

The integer address is formed from the decimal address by the formula:

$(\text{Area_Number} * 1024) + \text{Node_Number}$

Local and distributed routing tables and/or nameservers are typically used to translate to/from numerical to mnemonic forms of addresses. For example, the DECnet_HOST name **NSSDCA** is defined in the NSI/DECnet routing tables to be associated with the decimal address **75.188** which is rendered in integer form as **15548**. For example, an account/user "XSmith" (i. e., example Smith), on NSSDCA might be reached via DECNET with any of:

NSSDCA::XSMITH	(set host, copy, or e-mail)
15.188::XSMITH	(e-mail only)
15548::XSMITH	(set host, copy, or e-mail)

Within each of the above DECnet network groups, transparent global access is possible between nodes in areas 1-46. The use of poor man's routing (PMR) to access a node may be required in given cases, i.e., nodes in areas 47-63 are only "locally" rather than globally defined. With PMR, the user defines in the address the specific intermediate or gateway nodes that must be explicitly used to make an ultimately correct connection. PMR addresses take a form such as:

GATEWAY1::GATEWAY2::DECnet_HOST::DECnet_ACCOUNT

where the routing will then be forced to go through **GATEWAY1** to **GATEWAY2** before attempting connection to **DECnet_HOST**.

In the DECnet internet, global addresses among NSI/DECnet and ESnet are coordinated so that "transparent" access (non-specified routing) will work for all addresses in DECnet areas 1-46. However, the mapping between numerical addresses and host "names" are defined only within each of these networks (because their authorized uses are for distinct program objectives), so addressing between these networks must use numerical addresses. For reference, current tables of the mappings between host names and numerical addresses are maintained at Goddard Space Flight Center (GSFC) on NSSDCA as:

(NSI) NSSDCA::[SPANDB]SPAN_DB.COM
(ESnet) NSSDCA::[SPANDB]ESNET_DECNET_NODES.DAT

A less desirable but usable alternative is PMR through the site on one network (NSSDCA to reach NSI from ESnet or FNAL to reach ESnet from NSI in the United States) defined as a named site on the other network:

FNAL::NSSDCA::NSI_HOST::NSI_ACCOUNT (ESnet to NSI)
NSSDCA::FNAL::ESNET_HOST::ESNET_ACCOUNT (NSI to ESnet)

THEnet uses an independent assignment of DECnet addresses from NSI/DECnet and ESnet, such that connection to/from THEnet requires PMR through address translation gateways in Texas:

UTSPAN::UTADNX::THEnet_HOST::THEnet_ACCOUNT (NSI/ESnet to THEnet)
UTADNX::UTSPAN::NSI-ESnet_HOST::NSI-ESnet_ACCOUNT (THEnet to NSI/ESnet)

A listing of THENET nodes can be found in

UTSPAN::THENIC::[ROOT.DECNET]THENET_NODES_FULL.COM

As one example of a project-dedicated network, UARSnet is defined in a high DECnet area, with authorized access from sites outside the UARS program only by PMR through the node at NSSDCA and other selected UARS/NSI sites:

NSSDCA::UARS_HOST::UARS_ACCOUNT (NSI to UARS)
NSI/ES_HOST::NSI-ES_ACCOUNT (UARS to NSI/ESnet)

b. X.25 Packet-Switch Interconnect (PSI) DECnet

Additional DECnet systems are accessible using so-called X.25 connections and explicit/unique DTE (...) addresses from gateway computers on NSI/DECnet. System logicals on these gateways are sometimes defined to translate mnemonic forms of these addresses into the needed numerical DTE invisibly. Only certain addresses may be enabled on any given gateway; some of the addresses may also be restricted to specific users or users with special privileges. A PSI mail address might look like:

GATEWAY::PSI%HOST_DTE_Number::ACCOUNT

X.25 system access is possible (where authorized) via the command:

set host/x29 HOST_DTE_Number

c. Internet:

The Internet is a set of interconnected TCP/IP (Transmission Control Protocol/Internet Protocol) networks sharing a common address space. The term internet (lowercase i) is a more general term referring to any set of connecting networks using a common protocol.

The Internet is composed of a variety of specific TCP/IP networks, some of which are:

- NSI/IP (NASA Science Internet/IP)
- NSFnet (National Science Foundation network and various subsidiary regional networks)
- ESnet (Energy Sciences network)
- MFE net (Magnetic Fusion Energy network)
- DDN/MILnet (Defense Data Network and Military network)
- JUNET (Japanese University Network)

TCP/IP Internet addresses are generally of the form:

Internet_ACCOUNT@Internet_HOST.Internet_DOMAIN

The DOMAIN address is an expression of how the given Internet_Host fits into the overall Internet Domain Name System (DNS) hierarchical/tree structure. The absolute address Internet_HOST.Internet_DOMAIN is simply the trace of that tree structure, proceeding left to right from specific to general, with nodes associated with each of the tree levels separated by dots. A government agency address might look like:

Internet_ACCOUNT@Internet_HOST.CENTER.AGENCY.GOV

while an account/user at a university might look like

Internet_ACCOUNT@Internet_HOST.INSTITUTION.EDU
or **Internet_ACCOUNT@Internet_HOST.DEPARTMENT.INSTITUTION.EDU**

Examples (with our fictitious account/user XSMITH) might look like:

XSMITH@NSSDCS.GSFC.NASA.GOV
or **XSMITH@ELECTRON.PHYSICS.CALTECH.EDU**

For reference, the highest level Internet domains are:

Generic:	MIL	US Military
(main only)	GOV	Other US government
	EDU	Educational
	COM	Commercial
	NET	Network centers
	ORG	Nonprofit organizations

Country: By ISO-3166 two-letter acronym

The underlying Internet TCP/IP addressing is numerical. The data base to map names into numbers is distributed and resolved by successive unfolding of the address to an appropriate name service. The use of nameservers and various local tables sometimes allows the use of addresses (at local sites) without an explicit DOMAIN, but they will exist even if the address is invisible to the user.

Direct numerical addressing is also allowed (4 numbers separated by dots, read left to right from general to specific). For example, NSSDCS has the numerical address 128.183.10.164, so XSMITH might be reached via:

XSMITH@128.183.10.164

Name or numerical addresses may be used to connect for file transfers (using the File Transfer Protocol or FTP) or for TELNET remote logons.

Via the Internet, these various TCP/IP networks noted above are generally transparently interconnected. However, poor man's routing (PMR) is possible where still necessary, taking the general form:

Internet_ACCOUNT%Internet_HOST.DOMAIN%Gateway2@Gateway1

This address is resolved right to left, with the rightmost address always separated by the "@" symbol. Each of the Gateway addresses should be in a full HOST.DOMAIN form. TCP/IP PMR may be valid only for mail.

d. JANET:

The Joint Academic Network (JANET) in the United Kingdom interconnects a range of local networks in the UK research community. The JANET protocols are generally unique to JANET (ColourBook software), therefore access typically requires the use of a gateway machine.

JANET addresses (inside the UK) look generally similar to Internet addresses except that the domain hierarchies are read from left to right (general to specific) rather than right to left as with Internet. Some gateway services support automatic domain reordering.

e. BITNET-EARN:

BITNET (Because It's Time Network-US) and EARN (European Academic Research Network) are worldwide academic and research networks that connect many universities, colleges, and research centers. Addressing is transparent between BITNET and EARN.

BITNET-EARN supports electronic mail/messages and sending/receiving files. Remote logins are not supported, because the underlying architecture is store-and-forward as opposed to a direct connection. BITNET-EARN address syntax is similar to the Internet except that the DOMAIN-style hierarchical addressing structure is not a required attribute.

f. UUCP:

UUCP (UNIX-to-UNIX Copy Program) is a transport protocol for remote command execution and file/mail transfers on UNIX systems. It works in a store-and-forward mode, and hence cannot support remote logins nor real time file transfers. Error handling and return of undelivered messages is more primitive than in the other networks mentioned.

UUCP uses a form of PMR where successive addresses are separated by "bangs" or "!"s, where an address might take a form like:

HOST1!HOST2!UUCP_HOST@UUCP_ACCOUNT

and the routing is from HOST1 to HOST2 to the target UUCP_HOST.

g. Public Packet Network / TELENET:

Sometimes electronic access and mail to remote systems and users also is possible via the public/commercial packet switched networks where appropriate interconnections (TELENET) and/or mail accounts (TELEMAIL) exist. Various gateways between the public packet network and the other systems previously described exist.

All TELENET access to NASA computer facilities from outside the NASA Packet Switch Network (NPSS) must now flow through DACS II access control computer at MSFC. Access through DACS II requires an individual user account and password. Non-NASA systems allowing direct TELENET access are noted in the system description texts.

Public Packet mail (TELEMAIL) is different from most of the other network mail procedures described here in that mail is sent to and read from central computers rather than sent to individual sites. Public packet mail addresses under the X.400 standard are organized in a hierarchical structure of mail location/organization:

C(ountry):	e.g., USA, CANADA, JAPAN
ADMD (Administration):	e.g., TELEMAIL, ATI [Japan], TELECOM.CANADA
O rganization):	e.g., OMNET, KOSMOS, ESA, INTEC, NASA, GSFCMAIL, J. P. L.
PRMD (Private ADMD):	e.g., NASAMAIL, GSFC, JSCPROFS, RESTON.SSFP

and user/account identification:

	UN:	User_Name/User_ID
or	FN:	First_Name
	MI:	Middle_Initial
	SN:	Surname
or	PN:	Personal_Name = FN.MI.SN

Various combinations of the above are supported/required for various systems. X.400 mail to an address on GSFCMAIL might be expressed as:

(c:us,admd:telemail,o:gsfcmail,prmd:gsfc,un:XSMITH)
or **(c:us,admd:telemail,o:gsfcmail,prmd:gsfc,pn:Xample.X.Smith)**

h. N-1:

N-1 is an internal Japanese research network centered at ISAS. It is not presently accessible outside the immediate research community served.

II. Network-to-Network Gateways

For purposes of the following section, the address of a given system within a given network is assumed to be of the following form (within the network to which that system is directly connected):

NSI/DECnet: **DECnet_HOST::DECnet_ACCOUNT**
(from other DECnet Internet networks, as necessary, use **GATEWAY::DECnet_HOST** in place of **DECnet_HOST**)

Internet: **Internet_ACCOUNT@Internet_HOST.Internet_DOMAIN**
(from other TCP/IP networks, as necessary, use **%Internet_HOST.Internet_DOMAIN@GATEWAY** in place of **@Internet_HOST.Internet_DOMAIN**)

JANET: **JANET_ACCOUNT@JANET_DOMAIN.JANET_HOST**

BITNET: **BITNET_ACCOUNT@BITNET_HOST**

TELENET: Not Applicable—reference in this discussion for access to other systems only.

TELEMAIL: **(C:TMAIL_Cntry, ADMD:TMAIL_Admin, ORG:TMAIL_Organz,**
(X.400) PRMD:TMAIL_PrivAdmin, UN:TMAIL_Account)

UUCP: **HOST1!HOST2!UUCP_HOST@UUCP_ACCOUNT**

For internetwork access, it should also be noted that many host systems now have locally installed software that allows them to access or be accessed under several different protocols. An example would be a VAX/VMS system running MultiNet software, where such a system can then be defined simultaneously as a DECnet and TCP/IP Internet node. Users on a system with MultiNet can use a syntax in DECmail such as:

smtp%"Internet_ACCOUNT@Internet_HOST.Internet_DOMAIN"

and may have direct access to TCP/IP FTP for file transfers and TELNET for remote TCP/IP logons. Access to such a node from the TCP/IP Internet will look essentially like any other Internet node. In general, direct access where possible will work better than indirect/gateway access.

a. For Data System Access (Remote Logins):

User on NSI/DECnet to system on:

Internet: **\$ set host EAST** or
\$ set host 6913
login (*): **Internet_HOST.Internet_DOMAIN!** or
xxx.xx.xx.xxx! (TCP/IP numerical address)
login: **Internet_ACCOUNT** (at Internet_HOST)

JANET: **\$ set host ESIS** or
\$ set host 42007
login: **JANET**
password: **ANDJOHN**
service: **JANET_HOST**
login: **JANET_ACCOUNT** (at JANET_HOST)

BITNET: Not supported
UUCP: Not supported

User on **Internet** to system on:

DECnet: **telnet EAST.GSFC.NASA.GOV** or
telnet 128.183.104.4
login (*): **DECnet_HOST::** or
XXXXX:: (DECnet integer Node Number)
UserName: **DECnet_ACCOUNT** (at DECnet_HOST)

JANET: Requires individual account on **NSFNET-RELAY.AC.UK**

BITNET: Not supported

UUCP: Not supported

* N. B. Pass-thru must be correctly specified on first login prompt from EAST. Any error will necessitate breaking/re-initiating the connection to EAST. Note the mandatory "!" for numerical TCP/IP addresses and "!" for all DECnet addresses (mnemonic and numerical).

User on **JANET** to system on:

DECnet: X.29 connection to **SPAN-RELAY.AC.UK**

Node name? **SPAN_HOST**
Username: **SPAN_USER** (at SPAN_HOST)

Internet: Requires individual account on **NSFNET-RELAY.AC.UK**

BITNET: Not supported

UUCP: Not supported

User with **TELENET** access to system on:

SPAN: Access to SPAN is possible through the SPAN gateway at NSSDCA, which may be accessed via NASA DACSII gateway to the NASA Packet Switch System (NPSS). A DACSII User ID and Password is required, plus authorization for the specific service access needed and authorization/password to use the SPAN gateway itself.

Users with appropriate requirements should contact the SPAN NIC for further information and procedures to obtain the needed authorizations (US telephone, 301-286-7251, SPAN address NSSDCA::NETMGR, Internet address is netmgr@nssdca.gsfc.nasa.gov).

Individual systems may also be directly accessible via International X.25 circuits. The DTE of the desired system must be known by the person initiating the connection. NASA X.25 addresses are not documented in publicly-accessible form/locations.

Internet: Procedures to access NASA systems accessible through the Internet are similar to those described under SPAN. The contact for Internet is being determined.

JANET: TBD
BITNET: Not supported
UUCP: Not supported

b. For File Transfers:

User on **NSI/DECnet** (VMS) for files:

From Internet (*):
\$ copy EAST"Internet_HOST.Internet_DOMAIN
!Internet_User password"::"Internet_File" DECnet_File
To Internet (*):
\$ copy DECnet_File EAST"Internet_HOST.Internet_DOMAIN
!Internet_User Password"::"Internet_File"

From/to JANET: Not currently supported

From/to BITNET: TBD

User on **Internet** for files to/from:

NSI/DECnet (VMS) (*):
FTP east.gsfc.nasa.gov or FTP 128.183.104.4
login: SPAN_HOST::SPAN_User
password: [enter SPAN_User password] (at SPAN_HOST)

Then use normal FTP commands for file transfer.

JANET: Requires individual account on **NSFNET-RELAY.AC.UK**

BITNET: TBD

- * N. B. Note that file transfers between UNIX and VMS machines can have numerous subtle issues and problems due to dissimilarities in the underlying file systems and word representations. See Mason, et.al for some relevant notes and procedures.

User on **JANET** for files to/from:

SPAN: Not currently supported

Internet: Requires individual account on **NSFNET-RELAY.AC.UK**

BITNET: TBD

User on **TELENET** for: TBD

c. For Electronic Mail (primary gateways only):

NSI/DECnet to:

Internet: **EAST::"Internet_ACCOUNT@Internet_HOST.DOMAIN"**
JANET: **EAST::"JANET_ACCOUNT%JANET_HOST.JANET_DOMAIN
@NSFnet-RELAY.AC.UK"** (with JANET_DOMAIN in Internet order)
BITNET: **EAST::"BITNET_ACCOUNT@BITNET_HOST.BITNET"** (or)
DFTNIC::"JNET%"BITNET_ACCOUNT@BITNET_HOST"
UUCP: **EAST::"GW_HOST!UUCP_HOST!UUCP_ACCOUNT@UUNET.UU.NET"**
TELEMAIL: **EAST::"/C=TMAIL_Cntry/ADMD=TMAIL_Admin/ORG=TMAIL_Organ/
(X.400) PRMD=TMAIL_PrivAdmin/DD.UN=TMAIL_Account/@SPRINT.COM"**

Internet to:

DECnet: **DECnet_ACCOUNT%DECnet_HOST.dnet.nasa.gov**
(DECnet_HOST may be in integer form if NSI-registered node)
JANET: **JANET_ACCOUNT%JANET_DOMAIN.JANET_HOST
@NSFNET-RELAY.AC.UK** (with JANET_DOMAIN in JANET order)
BITNET: **BITNET_ACCOUNT@BITNET_HOST.BITNET**
UUCP: **GW_HOST!UUCP_HOST!UUCP_ACCOUNT@UUNET.UU.NET**
TELEMAIL: **/C=TMAIL_Cntry/ADMD=TMAIL_Admin/ORG=TMAIL_Organz/
(X.400) PRMD=TMAIL_PrivAdmin/DD.UN=TMAIL_Account/@SPRINT.COM**

JANET to:

DECnet: **"DECnet_HOST::DECnet_ACCOUNT"@UK.AC.SPAN-RELAY**
Internet: **Internet_User%Internet_HOST.Internet_DOMAIN
@UK.AC.NSFNET-RELAY** (with Internet_DOMAIN in Internet order)
BITNET: **BITNET_ACCOUNT%BITNET.BITNET_HOST@UK.AC.EARN-RELAY**
UUCP: **GW_HOST!UUCP_HOST!UUCP_User%UUNET.UU.NET
@UK.AC.EARN-RELAY**
TELEMAIL: **/C=TMAIL_Cntry/ADMD=TMAIL_Admin/ORG=TMAIL_Organz/
(X.400) PRMD=TMAIL_PrivAdmin/DD.UN=TMAIL_Account/%SPRINT.COM
@UK.AC.NSFNET-RELAY**

BITNET to:

DECnet: **DECnet_ACCOUNT@DECnet_HOST.dnet.nasa.gov**
Internet: **Internet_ACCOUNT@Internet_HOST.Internet_DOMAIN**

JANET: JANET_ACCOUNT@JANET_DOMAIN.JANET_HOST
(with JANET_DOMAIN in JANET order)

UUCP: GW_HOST!UUCP_HOST!UUCP_ACCOUNT@UUNET.UU.NET

**TELEMAIL: /C=TMAIL_Cntry/ADMD=TMAIL_Admin/ORG=TMAIL_Org/
(X.400) PRMD=TMAIL_PrivAdmin/DD.UN=TMAIL_Account/@SPRINT.COM**

TELEMAIL to:

**DECnet: (c:USA,admd:TELEMAIL,p:INTERNET,"rfc-822":
<DECnet_ACCOUNT(a)DECnet_HOST.DNET.NASA.GOV>)**

**Internet: (c:USA,a:TELEMAIL,p:INTERNET,"rfc-822":
<Internet_ACCOUNT(a)Internet_HOST.DOMAIN>)**

**JANET: (c:USA,a:TELEMAIL,p:INTERNET,"rfc-822":<JANET_ACCOUNT
(p)JANET_DOMAIN.HOST(a)NSFNET-RELAY.AC.UK>)
(with JANET_DOMAIN in JANET order)**

**BITNET: (c:USA,a:TELEMAIL,p:INTERNET,"rfc-822":
<BITNET_ACCOUNT(a)BITNET_HOST.BITNET>)**

**UUCP: (c:USA,a:TELEMAIL,p:INTERNET,"rfc-822":
<GW_HOST(b)UUCP_HOST(b)UUCP_ACCOUNT(a)UUNET.UU.NET>)**

III. Online Network Information Centers

SPAN_NIC (SPAN Network Information Center):

SPAN did maintain online network information via a menu-driven data base and an information system encapsulated in a no-password environment hosted on machines at the National Space Science Data Center. The information now is becoming somewhat out of date.

To access:

from DECnet: **\$ set host nssdca** or **\$ set host 15548**
 Username: **SPAN_NIC** (with no password)

from Internet: % **telnet nssdca.gsfc.nasa.gov** or
 % **telnet 128.183.36.23**
 Username: **SPAN_NIC** (with no password)

DFTNIC (Data Flow Technology Office Network Information Center):

The Advanced Data Flow Technology's NICHOLAS system is an online menu-driven information service intended for NASA or NASA-associated users to obtain various kinds of network mail, address connection information, and to aid in making certain cross-system terminal connections (DECnet to Goddard IBM/MVS, for example). It includes Internet "yellow pages" type services for both addresses/locations and sites maintaining anonymous accounts.

To access:

from DECnet: **\$ set host dftnic** or **\$ set host 15365**
 Username: **DFTNIC** (with no password)

from Internet: % **telnet dftnic.gsfc.nasa.gov** or
 % **telnet 128.183.10.3**
 Username: **DFTNIC** (with no password)

NSINIC (NASA Science Internet Network Information Center): TBD

To access:

from DECnet: **\$ set host dftnic** or **\$ set host 15365**
 Username: **NSINIC** (with no password)

from Internet: % **telnet dftnic.gsfc.nasa.gov** or
 % **telnet 128.183.10.3**
 Username: **NSINIC** (with no password)

THENIC (Texas Higher Education Network Information Center)

Information files are maintained accessible either via default DECnet file access from the DECnet Internet in **UTSPAN::THENIC::** via anonymous FTP from **nic.the.net** (TCP/IP address **128.83.151.15**) on the Internet or as LISTSERV file copies from **info@thenic** on BITNET. See the file THENET.INDEX for a current list of documents maintained in the INFO account.

ESNIC (Energy Sciences Network Information Center):

Information files are maintained accessible either via default DECnet file access from the DECnet Internet in **ESNIC::** (node **42158**) or via anonymous FTP from **esnic@nic.es.net** (node **128.55.32.3**) on the Internet. See the file \$index.txt for a current list of documents.

Internet Information:

Various information files are available via anonymous FTP at:

- nls.nsf.net/35.1.1.48 (NSFnet/MERIT information)
- nnsf.nsf.net/192.31.103.6 (NSFnet information)
- sh.cs.net/192.31.103.3 (CSnet information)
- nic.ddn.mil/192.67.67.20 (SRI/Internet Domain Information Center)

BITNIC (BITNET Network Information Center):

Within BITNET, retrieve online network information and an index of available online files from the file NETINFO FILELIST. For users outside BITNET, send an electronic message with the appropriate command as the only line in the body of the message to the BITNET address **LISTSERV@BITNIC**. Other files that may be of interest and to retrieve include **USER HELP** and **BITNET USERHELP**.

JANET:

From the UK, make X.29 connection to **UK.AC.JANET.NEWS** and logon with username of **news**.

a. Directory Listings and File Copies from the NICs:

DECnet Default File Access:

```
$ dir DECnet_NIC_HOST::  
$ copy DECnet_NIC_HOST::File_Name
```

Anonymous FTP:

```
% ftp Internet_HOST.Internet_DOMAIN or  
% ftp XXX.XX.XXX.XX (TCP/IP numerical address)
```

```
FTP> login  
Username: anonymous  
Password: guest or [your_name]
```

At the next FTP prompt, you are connected to the anonymous account on that host. "?" will give a list of valid FTP commands at that point in your FTP session, "help specific_command" will give you help on that command. "dir" will do a directory listing; "get" will retrieve a specified file to your local directory; "cd" can be used to change default directories on the foreign host. "quit" closes the connection and quits FTP.

BITNET Listservice:

From IBM/VM system:

. TELL LISTSERV AT BITNIC SENDME File_Name File_Type

From VAX/VMS or UNIX system:

. SEND LISTSERV @BITNIC SENDME File_Name File_Type

IV. Networking References

Hapgood, Michael. 1989. *Accessing SPAN from non-SPAN Nodes: A Guide for JANET Users*, Rutherford Appleton Laboratory Technical Publication.

LaQuey, Tracy L., ed. 1990. *The User's Directory of Computer Networks*.

Mason, Stephanie, R. Tencati, K. Capps, D. Stern, G. Dorman, and D. Peters. 1990. *The SPAN Cookbook: A Practical Guide to Accessing SPAN*, NSSDC/WDC-A-R&S, 90-14.

Peters, David J., P. L. Sisson, J. L. Green, and V. L. Thomas. 1989. *Space Physics Analysis Network Node Directory (The Yellow Pages): Fourth Edition*, NSSDC/WDC-A-R&S, 89-14.

Quarterman, John S. 1990. *The Matrix: Computer Networks and Conferencing Systems Worldwide*.

V. Summary of Purposes of the Various Data Systems

V. Summary of Purposes of the Various Data Systems

ACTSDS

The primary purposes of the ACTSDS are to ensure fast data acquisition, to perform Level-0 data processing, and to distribute all the appropriate data to the ACTIVE scientific community.

CDAW

The CDAW system is intended to further the conduct of large-scale collaborative scientific research using data from many investigators to address significant global-scale physical problems that may not otherwise be addressable. The CDAW program combines a traditional workshop format with the assembly of a data base from multiple spacecraft and ground sources, where the data and relevant models have been cast into a common format with supporting software and computer access to allow participants direct interactive graphic display and manipulation of the data. During the interval between workshops, access to the data base at NSSDC is allowed via the NSI/DECnet network. To date, all data bases have been in magnetospheric physics. The current system includes only CDAW 8 and CDAW 9; previous data bases were accessed under a different system that is being phased out.

CRRES

The purpose of the CRRES Data System is to provide CRRES researchers with Level-1 data in the form of agency tapes and GL researchers with access to the CRRES Time History Data Base (THDB), which contains science data from all CRRES sensors.

CSDS

The user community will primarily be the Cluster Science Team comprising all principal and co-investigators. It is also planned to make low-resolution data (SPDB plots) available to outside communities.

DE

The purpose of SDDAS is to allow space physics researchers easy access to the Dynamics Explorer 1 and 2 data sets for display and analysis. Presently, it is being upgraded to handle UARS PEM (Upper Atmospheric Research Satellite Particle Environment Monitor) data and the complete TSS-1 (Tethered Satellite System) mission data set.

DMSP

The data system is intended to serve those members of the solar-terrestrial relations community who study magnetospheric phenomena, particularly to aid low altitude and ground-based researchers.

ESIS

The European Space Information System is being designed to serve the information requirements of the space science community; space science includes astronomy, astrophysics, interplanetary space physics, etc. The main goals of ESIS are to coordinate the information contained in the European science data systems and to provide users with a uniform interface to these systems. This will allow users to obtain, compare, analyze, and exchange information in an efficient and homogeneous way.

EXOS-D

The purpose of SIRIUS is to provide satellite telemetry data as well as ephemeris data to the users.

GEOTAIL

The purpose of SIRIUS is to provide satellite telemetry data as well as ephemeris data to the users.

INTSDS

The primary purposes of the INTSDS are:

- to ensure fast data acquisition, perform Level-0 data processing, generate key physical parameter data sets, and distribute all the appropriate data to the INTERBALL scientific community.
- to provide a central repository for key physical parameter data and related instrument data sets.

IRPS

IRPS provides access to planetary image data and related information via electronic catalog searching and digital image processing. IRPS is used by local research staff and visitors as well as remote users who access the system through the PDS Central Catalog. IRPS is also used by the NASA Regional Planetary Image Facilities (RPIFs).

ISTP

The primary purposes of the CDHF are:

- to support the major data processing requirements of the GEOTAIL, WIND, POLAR, and SOHO spacecraft as far as performing Level-0 data processing, generating key parameter data sets for the principal investigators (PIs), and distributing all the appropriate data to the ISTP scientific community in a timely and accurate manner.
- to provide a central repository for key parameter data and related instrument data sets that can be electronically accessed and shared by the ISTP scientific community for the lifetime of the ISTP program.

The purpose of the DDF is to organize and distribute the products of the CDHF to the NSSDC, Japanese Institute of Space and Astronautical Science (ISAS), and the PIs/Co-Is.

MAX '91

The Max '91 Information System is intended to enhance and simplify observatory planning of large-scale collaborative research campaigns. However, it is used by a variety of scientists for other purposes than solar flare observations.

MD

The purpose of the MD is to provide researchers with a system to efficiently identify, locate, and obtain access to space and earth science data sets. The MD is a free, multidisciplinary, online information system containing data from NASA, U.S. federal agencies, universities, and international agencies that are of potential interest to the worldwide science community. The MD contains high-level descriptions of data sets and provides mechanisms for searching

for data sets by important criteria such as parameters measured, temporal and spatial coverage, spacecraft, and sensor. In addition, the MD offers automatic connections to over twenty online information systems providing more detailed information and other data services. The MD also provides general information about many data systems, data centers, and coordinated data analysis projects. The MD has increased its accessibility with the recent implementations in Japan, Italy, and Canada.

MPI

The purpose of MPI is to serve the AMPTE Investigator community.

NAIF

NAIF is developing the SPICE concept—a system for assembling, archiving, distributing, and providing easy user access to those fundamental ancillary (supplemental) data needed by scientists who are planning or reducing space science observations. Examples of ancillary data are:

- spacecraft ephemeris
- planet, satellite, comet, or asteroid ephemeris
- planet, satellite, comet, or asteroid physical and cartographic constants
- science instrument platform pointing direction (as a function of time)
- instrument mounting alignment and selected additional instrument information
- spacecraft command logs, supplemented with ground data system and experimenter notebook logs

NODIS

The purpose of NODIS is to provide a number of NASA and non-NASA data sets and information services online to facilitate rapid access over networks and dial-up lines.

PANDA

PANDA is intended to provide easy access to the data sets resident at the Discipline Node. Data subsets can be created with user-specified constraints, written in ASCII files with PDS labels and copied over a network to the user's host computer. PANDA also provides a variety of display and analysis capabilities.

PDS

The purpose of the Planetary Data System is to develop cost effective mechanisms for ingesting, curating, distributing, and using digital planetary science data.

PDS-PPI

The Planetary Data System (PDS) was established by NASA to make high quality planetary data readily accessible to the planetary science community. The Planetary Plasma Interactive (PPI) Node of PDS helps planetary scientists solve problems associated with locating and acquiring data for planetary plasma and magnetospheric investigations. PPI provides the science community with access to catalog and inventory information about fields and particles data as well as to a system with which to browse the data and carry out preliminary scientific investigations. There is a system for researchers to order the data and ship it to their home institutions. Users also have access to data analysis tools and to empirical and theoretical models. The PPI Node has a distributed architecture with subnodes at the University of Iowa, Goddard Space Flight Center, and UCLA.

PDS-SBN

The purpose of PDS-SBN is to provide a live archive of data from spacecraft operated by the Solar System Exploration Division and other data of interest to scientists studying the bodies of our planetary system.

PDS RINGS

When operational, the PDS Rings Node will provide data and cataloging services online, so that users may rapidly browse, select, and order data sets.

RAL-GDF

The purpose of the Geophysical Data Facility is to provide data to researchers in the areas of atmospheric science, space plasma science, and earth observation.

SELDADS

SELDADS is dedicated to acquiring, processing and displaying solar-geophysical data in real-time, primarily in support of the Space Environment Services Center (SESC) and the U. S. Air Force Global Weather Central (AFGWC). Data and products are provided to a user community engaging in national defense, satellite operations, aviation, electric power distribution, communications, geophysical exploration, pipeline operations, and a variety of scientific studies.

SELSIS

SELSIS provides near real-time solar images to SEL and the USAF Space Forecast Center (SFC) for use in their operational solar forecast centers, the Space Environment Lab (SEL) research group, and the National Geophysical Data Center (NGDC) for archival and distribution to other potential users.

SMM DAC

The SMM DAC acts as a distributed data center for the NSSDC by providing online access to SMM science data, ancillary ground based data sets, software for reducing and analyzing these data, and catalogs of SMM and related data sets.

SOHO

The purpose of the SOHO data system is to ensure maximum return for the scientific community of the data produced by the SOHO spacecraft by:

- providing a facility to operate the imaging instruments of SOHO in real-time in a sort of observatory mode.
- providing the infrastructure necessary (data bases, electronic links, etc.) to coordinate the operation of the SOHO investigations among themselves and with other ground and space observatories.
- providing the necessary infrastructure for data analysis by the SOHO investigators, guest investigators, and the scientific community at large.

SSC

The SSC is designed to serve the planning needs of investigators and project offices. It coordinates data acquisition and collaborative efforts pertaining to spacecraft science operations, including single- and multiple-spacecraft activities with related ground-based observations.

UARS

The UARS CDHF is the focal point for the collaborating and scientific processing of the UARS data. It also ensures the UARS Science Team access to the data.

UCLASSC

The UCLASSC maintains a catalog of magnetic field sensor records from several spacecraft to facilitate research by scientists within UCLA and throughout the scientific community.

VI. Glossary of Acronyms

VI. Glossary of Acronyms

ACRIM	Active Cavity Radiometer Irradiance Monitor
AFB	Air Force Base
AFGWC	U. S. Air Force Global Weather Control
AIAA	American Institute of Aeronautics and Astronautics
AMPTE	Active Magnetospheric Particle Trace Explorers
AMPTE-IRM	Active Magnetospheric Particle Trace Explorers-Ion Release Module
AMPTE-UKS	Active Magnetospheric Particle Trace Explorers-United Kingdom Sub-Satellite
ANSI	American National Standards Institute
ARPA	Advanced Research Projects Agency
ASPOC	An instrument that measures ion current
BANAL	B Field Analysis
BITNIC	BITNET Information Center
BITNET	Because It's Time Network
CANOPUS	An electronic newsletter published by the AIAA
CCT	Computer Compatible Tape
CDF	Common Data Format
CDIAC	Carbon Dioxide Information Analysis Center
CDHF	Central Data Handling Facility
CD-ROM	Compact Disk-Read Only Memory
CDS	Central Data Services
CIS	Ion Plasma Data
COI	Co-Investigator
COM	Commercial
COSMIC	Computer Software Management Information Center
C/P	Coronagraph/Polarimeter
CQ	Create Query
CRAF	Comet Rendezvous Asteroid Flyby
CRRES	Combined Release and Radiation Effects Satellite
CRT	Cathode Ray Tube
CSDS	Cluster Science Data System
CST	Cluster Science Team
CZCS	Coastal Ozone Color Scanner
DAT	Digital Audio Tape (4 mm)
DB	Data Base
DBMS	Data Base Management System
DDC	Discipline Data Center
DDF	Data Distribution Facility
DDN/MILNET	Defense Data Network and Military Network
DDS	Data Distribution System
DE	Dynamics Explorer
DFTNIC	Data Flow Technology Office Network Information Center
DFS	Data Flow System
DIF	Directory Interchange Facility
DMSP	Defense Meteorological Satellite Program
DNS	Domain Name System
DNICP	(PDS Small Bodies Node)
DOMAIN	An expression of how the Internet address fits into the Domain Name System
DRAC	Data Reduction and Analysis Center
DSN	Deep Space Network
DSTS	Deep Space Tracking System
EDU	Educational
EEEOF	European Extension of the EOF
EFW	A group of summary parameters in the CSDS Cluster
ELV	Expendable Launch Vehicle

EOF	Experiment Operations Facility
EOL	End of Life
EOM	End of Mission
ESIS	European Space Information System
ESA	European Space Agency
ESA-IRA	European Space Agency-Information Retrieval Service
ESANET	European Space Agency Network
ESIS	European Space Information System
ESNET	Energy Sciences Network
ESNIC	Energy Sciences Network Information Center
ESO	European Southern Observatory (Garching, Germany)
ESOC	European Space Operations Center
ESRIN	Establishment of the European Space Agency
ESTEC	European Space Research and Technology Center
ETR	Eastern Test Range
EXOS-D	A Japanese satellite also known as Akebono
EXOSAT	European X-Ray Astronomy Satellite
FACOM	The main frame computer at ISAS
FILETER	Feature Identification
FGM	Magnetic Field and Location Experiment
FL	File Lister
GB	Giga Byte
GDF	Geophysical Data Facility
GEOTAIL	A satellite in the ISTP program
GISS	Goddard Institute for Space Studies
GGS	Global Geospace Science
GO	Guest Observer
GOES	Geostationary Operational Environmental Satellite
GOV	Other U.S. Government
GRS	Gamma Ray Spectrometer
GSE	Geocentric Solar Ecliptic (Coordinate System)
GSFC	Goddard Space Flight Center
GSTDN	Ground Spaceflight Tracking and Data Network
HGA	High Gain Antennae
HP	Hewlett Packard
HST	Hubble Space Telescope
HXIS	Hard X-Ray Imaging Spectrometer
HXRBS	Hard X-Ray Burst Spectrometer
IACG	Inter-Agency Consultative Group (for Space Science)
ICIMPSW	ISEE-3/IMP-8/Solar Wind
IDFS	Instrument Data File Set
IDL	Interactive Data Language
IGPP	Institute of Geophysics and Planetary Physics
IGRF	International Geomagnetic Reference Field
IMP	Interplanetary Monitoring Platform
IMSL	Mathematical Language
INGRES	A specific commercial data base
INTSDS	Interball Science Data System
IPAC	Integrated Power/Attitude Control
IPD	Information Processing Division
IRI	Ion Release Module (AMPTE spacecraft)
IRPS	Image Retrieval and Processing System
IRTM	Infrared Thermal Mapper
ISAS	Institute of Space and Astronautical Science
ISEE	International Sun-Earth Explorer
ISTP	International Solar-Terrestrial Physics
IUE	International Ultraviolet Explorer
JANET	Joint Academic Network in the United Kingdom

JGR	Journal of Geophysical Research
JHU	Johns Hopkins University
JPL	Jet Propulsion Laboratory
JUNET	Japanese University Network
MAWD	Mars Atmospheric Water Detector
MAXT	A mnemonic for MAX '91 and Telnet
MDI	Michaelson Doppler Imager
MFENET	Magnetic Fusion Energy Network
MIL	Military
MOU	Memorandum of Understanding
MPI	Max Planck Institute
MSFC	Marshall Space Flight Center
MSIS	Mass Spectrometer Incoherent Scatter (atmosphere model)
NAIF	Navigation Ancillary Information Facility
NASA	National Aeronautics and Space Administration
NASDA	Japanese National Space Development Agency
NCAR	National Center for Atmospheric Research
NCDS	NASA's Climate Data Center
NED	National Extragalactic Data Base
NET	Network Centers
NIC	Network Information Center
NGDC	National Geophysical Data Center
NOAA	National Oceanic and Atmospheric Administration
NODIS	NSSDC's Online Data Information System
NODS	NASA's Ocean Data System
NORAD	North American Air Defense Command
NPSS	NASA Packet Switch Network
NSF	National Science Foundation
NSFnet	National Science Foundation Network
NSN	NASA Science Network
NSI	NASA Science Internet
NSI/DECnet	NASA Science Internet DEC Network (formerly SPAN)
NSSDC	National Space Science Data Center
NUA	Network User Address
ODL	Object Definition Language used by PDS
OMNI	(Interplanetary Medium Data)
ORG	Non-profit Organization
OS	Operating System
PANDA	Planetary Atmospheres Node Data Analysis
PDS-SBN	Planetary Data System-Small Bodies Node
PBBS	Public Bulletin Board System
PDS	Planetary Data System
PEACE	Electron Plasma Data
PIs	Principle Investigators
PICS	Planetary Image Cartography System
PID	Prototype International Directory
PIMS	Personnel Information Management System
PMR	Poor Man's Routing
POLAR	A satellite in the ISTP program
PPDB	Prime Parameter Data Base
PPI	Particles Per Inch
PPI	Planetary Plasma Interactions
PROMIS	Polar Regions Outer Magnetosphere International Study
RAPID	Energetic Ions
RAL	Rutherford Appleton Laboratory, United Kingdom
RAL-SSD	Rutherford Appleton Laboratory-Space Science Departments
RDAF	Remote Data Analysis Facility
RDBMS	Relational Data Base Management System

R-EXEC	The executive program at RAL GDF
RGON	Ground Magnetometer Network
RISC	Reduced Instuctor's Set Chip
ROLM	The Goddard Space Flight Center phone system
RPIF	Regional Planetary Image Facilities
SBN	Small Bodies Node
SDCS	SAR Data Catalog System
SDDAS	Southwest Data Display and Archival System
SEL	Space Environment Laboratory
SELVAX	Space Environment Laboratory VAX
SELDADS	Space Environment Laboratory Data Acquisition and Display System II
SELSIS	Space Environment Laboratory Solar Imaging System
SESC	Space Environment Services Center
SFC	Space Forecast Center (NOAA)
SFDU	Standard Format Data Unit
SIMBAD	Set of Identifications, Measurements, and Bibliography for Astronomical Data
SIRIUS	Scientific Information Retrieval and Integrated Utilization System
SM	San Marco (satellite, Italian)
SMAK	Screens, Menus, and Keyboards
SMM	Solar Maximum Mission
SMM DAC	Solar Maximum Mission Data Analysis Center
SOHO	Solar and Heliospheric Observatory
SOON	Solar Optical Observing Network (USAF)
SPARC	A work station manufactured by SUN Computers
SPDB	Summary Parameter Data Base
SPICE	A computer language used at the PDS NAIF node
SPICELIB	SPICE Library
SQL	Standard Query Language
SQL	Structured Query Language
SSC	Satellite Situation Center
SSL	Small Space Laboratory
ST	Solar-Terrestrial
STARCAT	Space Telescope Archive and Catalogue
STARLINK	A network in the United Kingdom
STECF	Space Telescope European Coordinating Facility
STP	Solar Terrestrial Probe
STS	Space Transportation System
STS	Solar-Terrestrial Science
SRI	Southwest Research Institute
SWT	Science Working Team
TAE	Transportable Applications Executive
TANAL	Trajectory Analysis
TBD	To Be Determined
TCP/IP	Transmission Control Protocol/Internet Protocol
TDRSS	Tracking and Data Relay Satellite System
TELNET	A public packet switched network owned by GTE
THENET	Texas Higher Educational Network
THENIC	Texas Higher Education Network Information Center
THDB	Time History Data Base
TOMS	Total Ozone Mapping Spectrometer
TSS-1	Tethered Satellite System
TTY	Teletype
UARS	Upper Atmosphere Research Satellite
UARSPM	Upper Atmospheric Research Satellite Particle Environment Monitor
UCLA	University of California, Los Angeles
UCLASSC	University of California, Los Angeles Space Science Center
UCSS	UARS CDHF Software System

UK	United Kingdom
UMCP	University of Maryland at College Park
USAF	United States Air Force
USGS	U. S. Geological Survey
UUCP	UNIX to UNIX Copy Program
UVSP	Ultraviolet Spectrometer
VAX	Virtual Address Extension
VILSPA	Villafranca Satellite Tracking Stations (near Madrid Spain)
VMS	Virtual Memory System
WDC	World Data Center
WDC-A-R&S	World Data Center A for Rockets and Satellites
WEC	Wave Experiment Data
WHISPER	The sounder instrument aboard the Cluster satellites
WIND	A satellite in the ISTP program
WORM	Write One Read Many
WS	Work Space
WTR	Western Test Range
XRP	X-Ray Polarimeter

VII. Appendix

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Dial-Up Access to Interchange Electronic Mail and to Reach Communications Networks from Public European Switched Networks

I. Introduction

The main purpose of this guide is to help users to interchange electronic mail or to access communications networks from public European networks using the dial-up (X.28) procedure.

Users can dial the electronic mail or network access point, the NUA (Network User Address), in a particular country and after a security clearance the requested service can be reached.

Basic requirements for the dial-up access are:

- a terminal or a personal computer with serial communications interface according to IEEE RS 232-C, CCITT v.24/28, X.21
- a CCITT standard modem
- a connection to the public switched telephone network
- a subscription to the packet switched public data network (NUI)

The subscriptions to the national public switched data networks (Network User Identification=NUI) is the user's responsibility. Users must request an NUI from the national PTT of the country the where the call originates. The PTT contact points are included in the annex by country.

ESANET, the European Space Agency Communications Network already has NUAs in many European countries and the United States. Users should access ESANET through the NUA available in the country that they are located. If no ESANET NUA is available in that country, please dial the nearest foreign ESANET NUA. Most of ESANET NUAs have subaddressing that allows for different services within ESA. To subscribe to the additional services, the user sends a request to the service provider. When the request is approved, the subaddressing is sent to the user.

This guide contains two parts: a general one, which applies to most countries (i.e., commands from the user's terminal to the public PAD and service messages from the public network). The second part describes the different country dial-up procedures and relevant information for that country (i.e., login and logout procedures). This issue includes only fifteen ESA European countries. In future issues, other countries (i.e., the United States and Japan) will be added.

Although all efforts were made to include accurate information, please take into account that small deviations are possible. If you encounter difficulties, please do not hesitate to contact the national PTT Administration contact points.

II. Commands from the User's Terminal to the Public Pad

This section is a representative list of the most common commands that users may send from their terminal to the public pad.

Command	Description
CLR or CLEAR	Request to disconnect.
CON	Request to connect.
INT	Request to send interrupt packet.
INTD	Request to send interrupt packet and discard output.
LANGUAGE?	Request to show command and service message language.
PAR?	Request to list all or selected PAD parameter values.
PROFn	Selection of existing PAD profile n.
PROF?	Selection of existing PAD profile.
RESET	Request to reset.
SET	Change selected parameter values.
SET?	Change selected parameter values. Show new values.
STAT or STATUS	Show status on virtual call connected to the DTE.

III. Service Messages/Clear Codes from the PSPDN

This section is a representative list of the messages or clear codes that can be received from the PSPDNs.

Message	Description
CLR	Clearing has been made.
CLR CONF	Confirmation of clearing.
CLR DER	Called number out of order.
CLR DTE	Called subscriber has cleared the call.
CLR ERR	Procedure error at your terminal.
CLR INV	Invalid facility selected or faulty NUI.
CLR NA	Not admitted.
CLR NC	Congestion/failure in network.
CLRNP	Called subscriber number does not exist.
CLR OCC	Called subscriber number is busy.
CLR PAD	Called subscriber has cleared the call.
CLR RNA	Called subscriber refuses reverse charges.
CLR RPE	Procedure error at the called subscriber.
ERR	Erroneous command.
NUI	Erroneous NUI.

Note: For Spain, Sweden, and the United Kingdom the service messages appear without the prompt CLR (i.e., the message CLR DTE appears as DTE).

This table explains how to properly interpret the Login and Logout procedures:

(CR)	Carriage return key.
(CTRL)	Control key simultaneously.
<>	The data within these brackets is required by the network.
[]	Optional data may be input in the area within these brackets.
<LF>	Linefeed key.
" "	Data between quotation marks is required.
<space>	Space key.
TBA	To Be Added in a later issue.

Sources to compile this section: CEPT Commercial Action Committee, European PTT Administrations.

IV. Annex: General Information and Login and Logout Procedures

Austria

PTT Administration: Post Und Telegraphen Verwaltung

PSPDN: Datex-P

PTT Contact:

Address: General Direktion der Post und
Telegraphenverwaltung
Postgasse 8
1011 Wien

Telephone: +43-222-51555

FAX: +43-222-51288414

TELEX: 112300 GENT A

Login Procedure: TBA

Logout Procedure: TBA

Belgium

PTT Administration: RTT (Regie des Telegraphes et des Telephones)

PSPDN: DCS

PTT Contact:

Address: RTT - DCS Technical Support
Service Commercial
Rue des Palais 42
1210 Bruxelles

Telephone: +32-2-1251 (Dutch language)
+32-2-1351 (French language)
+32-2-2134111

FAX: +31-2-2188209

TELEX: 24990 GENT B

Telephone numbers to Access the PSPDN:

City:	Prefix/Number:	Speed (bps):
	1721	300
	1722	1200
	1723	75/1200

ESANET NUA:

+2062-610163xxxx

Application:

ESAPAC

Login Procedure:

User:

Call DCS.

Enter:

N<nui>-<DTE address>
(CR)

STAT(CR) for status of
communication

PAR? 1,3,5 (CR) to check
the value of parameters.

PAR? check for value

SET?3:126(CR)

DCS:

DCS will answer: RTT-PAD 2XXX (2XXX = access port)
when the modem line is established (see numbers above).

DCS will answer: <DTE address> COM

The PAD will answer PAR1:1,3:126,5:1
or whatever the values are.

The PAD will list the values of all parameters -
SET3:126,(CR) to change parameter 3. The change
is executed without a confirmation of the action.

The PAD will confirm that the change has been
executed.

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PROF4(CR)

All PAD parameters will change to a preset value according to Profile 4.

Now the data exchange phase may commence. The user may proceed according to host instructions.

Logout Procedure:

User:

DCS:

To end the call enter:
(CTRL)PRRT-PAD 2XXX

DCS will answer: CLR CONF

The call is cleared. The user may choose to either disconnect the physical circuit, or to log into another host.

Denmark

PTT Administration: G.D. for Post-og Telegrafvaesenet
General Direktoratet for Post-og
Telegrafvaesenet
Telegade 2
2630 Trastrup
Kobenhavn

PSPDN: Datapak

PTT Contact:

Address: Datapak Customer Support

Telephone: +45-1-993665 (KTAS)
+45-6-196388 (JT)
+45-9-0025 (FT)
+45-4-620145 (TS)
+45-2-529111 (Ext: 2477)

FAX: +45-4-2529341

TELEX: 22999 TELCOM DK

Telephone Numbers to Access the PSPDN:

City:	Prefix/Number:	Speed (bps):
	0071	300
	0071	1200
	0071	2400
	0072	75/1200

Login Procedure:

User:

Call Datapak.
When the connection is
established (see numbers above),
a high tone is transmitted.

Connect your modem, then
enter: (CR) GO <NUI>

CON<Subscriber number>
[<facilities>] [<User: data>] (CR)

Datapak:

Then Datapak prompts "Enter NUI"

Datapak will answer: Datapakx28 "PAD-ID:"
"PAD-identification" PMC "Port Number"

Datapak will answer: "COM"

Now the data exchange phase may commence. The user may proceed according to host instructions.

Logout Procedure:

User:

End the call with the following
commands: (CTRL)P

CLR(CR)

Datapak:

Datapak will answer: "CLR CONF"

The user may choose to either disconnect the physical circuit, or to log into another host.

Germany

PTT Administration: DEUTSCHE BUNDESPOST TELEKOM

PSPDN: Datex-P

PTT Contact:

Address: Fernmeldetechnisches Zentralamt (FTZ)
Ref. Kundenberatung fuer Datendienste
Am Kavalliersand
Postfach 5000
6100 Darmstadt

Telephone: +49-6151-834641
FAX: +49-6151-834639
+49-6151-8344791
TELEX: 419511 FTZ D

Telephone Numbers to Access the PSPDN: Access numbers are different depending on the city. These numbers are supplied to you with the NUI.

ESANET NUA:	Application:
+2624-5615124xxx	ESAPAC
+2624-5615140044	NSI/DECnet
+2624-5615140054	DATUS

Login Procedure:

User:

Call Datex-P access number of the city which you are located or that of the nearest node.

Enter one full stop and (CR)

Enter your NUI by typing "NUI" (CR)

Type your NUI password and (CR)

Enter the call request mode to access the required host.

Datex-P:

At the sound of the tone, place the data set in data mode.

Datex-P will answer: DATEX-P: Port address

Datex-P will prompt you for your space, your assigned <NUI>, and a password.

Datex-P will respond: DATEX-P: password
XXXXXX(CR)

DATEX-P network user identifier DXXXXXXX active

Datex-P will answer:
DATEX-P call connected to

Now the data exchange phase may commence. The user may proceed according to host instructions.

Logout Procedure:

User:

To clear the call, enter:
(CTRL)PCLEAR(CR)

Datex-P:

Datex-P will answer:
DATEX-P: call cleared-local directive (XXY)
followed by a Datex-P herald

The user may choose to either disconnect the physical circuit, or to log into another host.

Finland

PTT Administration: FINTELCOM

PSPDN: Datapak

PTT Contact:

Address: PTT-Finland
Data Customer Service
P. O. Box 104
SF-000511, Helsinki, Finland

Telephone: 98007555 (National)
+358-0-70981 (International)
+358-0-7041

FAX: +358-0-7042659

TELEX: 123434

Telephone Numbers to Access the PSPDN:

City:	Prefix/Number:	Speed (bps):
	92911	300 (V.21)
	92912	1200 (V.22)
	92913	2400 (V.22bis)
	92914	75/1200 (V.23)

Login Procedure:

User:

Enter from the terminal
H(CR)

Then you have 60 seconds
to type in your NUI and the
called subscriber address
(or network COM user address).

Datapak:

Datapak answers: YDV DATAPAK

If the connection is successful
Datapak will answer.

If unsuccessful Datapak will answer: CLR XXX YYY

Now the data exchange phase may commence. The user may proceed according to host instructions.

Logout Procedure:

User:

Enter (CTRL)P from your
terminal

Then type CLR(CR)

Datapak:

Datapak will answer: CLR CONF

The user may choose to either disconnect the physical circuit, or to log into another host.



France

PTT Administration: FRANCE TELECOM Minister des PTT

PSPDN: Transpac

PTT Contact:

Address: NUI subscription and help services Intelcomfrance
Tour Franklin, Cedex 11
90281-Paris la Defense

Transpac
Direction Commerciale
Tour Maine-Montparnasse
33 Avenue du Maine
75682 Paris

Telephone: +33-1-47627960 (NUI)
+33-1-45388888 (Transpac)
FAX: +33-1-45387147
TELEX: 610586 CPTI F (NUI)
260676 TPC F x (Transpac)

Telephone Numbers to Access the PSPDN:

City:	Prefix/Number:	Speed (bps):
	3601	300
	3600	1200

ESANET NUA: 2080-75092535xx
Application: ESAPAC

Login Procedure:

User:

Call Transpac. When connection is established, (see numbers above) a high pitched tone is transmitted.

Connect your modem.

Make the call:

Transpac:

Transpac will answer:
TRANSPAC XXXXXXXXXXX (port number)

- National-Transpac will answer:
<subscriber number> [p/d user data]
(CR)"COMM"(successful call)
"LIB XXX 999" (unsuccessful)
- International: <subscriber number> <p/d nu>[user data] (CR)

Since the NUI is six characters long, user data should not exceed six characters.

Now the data exchange phase may commence. The user may proceed according to host instructions.

Logout Procedure:

User:

By calling terminal:
Enter (CR)P then LIB(CR)

By called terminal:

Transpac:

Transpac will answer:
LIB CONF

Transpac displays LIB DTE 999 or LIB PAD

The user may choose to either disconnect the physical circuit, or to log into another host.

Ireland

PTT Administration: TELECOM Ireland

PSPDN: Eirpac

PTT Contact:

Address: Telecom Eirann
6-8 College Green
Dublin 2

Telephone: +353-1-778222 (Customer support)
+353-1-778111 (Technical support)

FAX: +353-1-716916

TELEX: 91119 TEHQ

Telephone Numbers to Access the PSPDN:

City:	Prefix/Number:	Speed (bps):
	0850300	300
	0851200	1200
	0851275	75/1200

Login Procedure:

User:

Call Eirpac. When connection is established, (see number above) Eirpac's modem will generate a high pitched tone.

Connect modem to line by typing:
(CR)

After the modem handshake type: (CR)
Type NUI<YYYYYYYY>(CR), where
YYYYYYYY is the NUI

<PASSWORD> (CR)

<DTE address> (CR)

Eirpac:

Eirpac will greet you and then with:
EIRPAC XXXXXXXXXX (The numbers here
depend on node/port and speed accessed.)

Eirpac will respond: EIRPAC:PASSWORD
XXXXX

Eirpac will respond: NUI YYYYYYYY active

Eirpac will respond: call connected to
<DTE address>

Now the data exchange phase may commence. The user may proceed according to host instructions.

Logout Procedure:

User:

To end the call enter:
(CTRL)P, and then: EIRPAC:
CLR(CR)

Eirpac:

Eirpac will respond:
call cleared-local directive

The user may choose to either disconnect the physical circuit, or to log into another host.

Italy

PTT Administration: Ministero delle Poste e delle Telecomunicazioni

PSPDN: Itapac

PTT Contact:

Address: Direzione Centrale Servizi Telegrafici
Viale America
00100 Roma

Telephone: +39-6-54601 (Ext. 4969)

FAX: +39-6-54604961

TELEX: 6100700 GEENTEL I

Login Procedure:

User:

Call Itapac access number of the city in which you are located or that of the nearest node.

On hearing the high pitched tone, press the data button on modem within 10 seconds.

Send 2(CR) characters within 30 seconds.

Send the call request, specifying the NUI and the address identification the (NUA) of the user data field: where YYYYYY = NUI and ZZZZZZ = NUA.

Itapac:

Itapac will send back a high pitched tone.

Itapac will send the network identification, the PAD (ACP) identifier and the PSTN access point identifier Example: ITAPAC <ROMA>PORTA:<5>

Itapac sends the established virtual call: N<YYYYYY>-<ZZZZZZ>D(or P) [<ABC>] of ACP:COM

Note: If the letter P is used instead of D, data will not be displayed on your terminal.

Now the data exchange phase may commence. The user may proceed according to host instructions.

Logout Procedure:

User:

To end the call enter: (CTRL)P

Itapac:

Itapac will answer: CLR and then send the disconnection request CLR CONF

The user may choose to either disconnect the physical circuit, or to log into another host.



The Netherlands

PTT Administration: PTT TELECOM

PSPDN: Datanet 1

PTT Contact:

Address: PTT Datacommunicatie
Postbus 30000
2500 GA, Den Haag

Telephone: +31-70-438544
FAX: +31-70-433794
TELEX: 31255 ITEL NL

ESANET NUA:

+2041-171171xxxx
+2041-171075xxxx
+2041-171003xxxx

Application:

ESAPAC
NSI/DECnet
DATUS

Login Procedure:

User:

Call Datanet 1
(see numbers above)

Type:

A(CR) for ASCII terminal
O(CR) for Prestel terminal
5(CR) for Teletel terminal

Type the NUI: YYYYYY(CR)

Type the password:
PPPPPPP(CR)

Send the call request
specifying the NUA (CR)

Datanet 1:

Datanet 1 will ask for terminal identifier: TER
Basic menu appears.

Datanet 1 will ask for NUI: Gebruikersnummer:

Datanet 1 will ask for password:

The password is echoed as dashes.
After validation, the 8 alphanumeric characters
the following message appears: WELKOM TO
DATANET 1

Now the data exchange phase may commence. The user may proceed according to host instructions.

Logout Procedure:

User:

To end the call enter:
<CTRL>P

Datanet 1:

Datanet 1 will answer: CLR(CR) and then send the
disconnection request CLR CONF

The user may choose to either disconnect the physical circuit, or to log into another host.

Norway

PTT Administration: PTT-N

PSPDN: Datapak

PTT Contact:

Address: PTT-N
Televerket
Postboks 6701
St Olavs Plass
0131 Oslo

Telephone: +47-2-488990
FAX: +47-2-488720
TELEX: 71203 GENTL N

Telephone Numbers to Access the PSPDN:

City:	Prefix/Number:	Speed (bps):
	0165	300
	0165	1200
	0165	75/1200

Login Procedure:

User:

Call Datapak
(see numbers above).

Enter service request signal:
(CR) (terminal type) (CR)

Enter the SELECT command:
N(ID AND PSWD)-A(X.121Address)

Datapak:

Datapak will answer:
(PSE/A(MACHINE)-PORT Address)

Datapak will respond: (X>121Address)+COM
Datapak will display the values of the requested
parameters. For example: (CR)DI(CR) OSL/A02-
9090003346123456-A0311090900029
311090900029+COM

Now the data exchange phase may commence. The user may proceed according to host instructions.

Logout Procedure:

User:

To end the call enter:
(CTRL)P and then send
accounting data.

Datapak:

Datapak provides the clear the disconnection
request with CLR CONF (i.e., CLR(CR)
CLR message: CONF(00)dd:hh:mm; ss rr ss)

The user may choose to either disconnect the physical circuit, or to log into another host.



Spain

PTT Administration: TELEFONICA-CTNE

PSPDN: Iberpac

PTT Contact:

Address: TELEFONICA-CTNE
Departamento de Telematica
Avenida del Brasil 17
Madrid 20

Telephone: +34-1-4105460
FAX: +34-1-4194840
TELEX: 47786 CTNE E

ESANET NUA: **Application:**

+2145-213021332x ESAPAC

Login Procedure:

User:	Iberpac:
Call Iberpac (see numbers above).	Iberpac will send a high pitched tone.
Enter: . . (CR)	Iberpac provides the simple profile and greets you with IBERPAC
Enter (in capital letters): N<NUI-ODATEaddress>[data](CR)	Iberpac will answer: COM call connected

Now the data exchange phase may commence. The user may proceed according to host instructions.

Logout Procedure:

User:	Iberpac:
To end the call enter: CLR(CR)	Iberpac will answer: CLR CONF

The user may choose to either disconnect the physical circuit, or to log into another host.

Sweden

PTT Administration: PTT-S

PSPDN: Datapak

PTT Contact: PTT-S

Address: Televerket
Marbackagatan 11
12386 Farsta

Telephone: 020-910025 (National)
+46-8-7806228 (International)

FAX: +48-8-7006181

TELEX: 12020 DATASTH S

Telephone Numbers to Access the PSPDN:

City:	Prefix/Number:	Speed (bps):
	0209-10026	300
	0209-10028	1200
	0209-10028	2400
	0209-10027	75/1200

Login Procedure:

User:

Call Datapak.
(see above numbers)

Enter A or the terminal
identifier valid for your
equipment.

Enter the sequence:
Cu N<username>password-
<DTE address> (CR)

Datapak

When modem line is established, Datapak will
answer: PLEASE TYPE YOUR TERMINAL
IDENTIFIER

Datapak greets you with: ***DATAPAK PAD
SERVICE***2020:01-007-PAD READY

Datapak will answer: COM: CALL CONNECTED

Now the data exchange phase can commence. The user may proceed according to host instructions.

Logout Procedure:

User:

To end the call enter:
(CTRL)P
CLR(CR)

Datapak:

Datapak will answer and then send the
disconnection request: CLR CONF: CALL
CLEARED BY REQUEST

The user may choose to either disconnect the physical circuit, or to log into another host.



Switzerland

PTT Administration: PTT BETRIEBE

PSPDN: Telepac

PTT Contact:

Address: Generaldirektion der PTT Betriebe
Viktoriastrasse 21
3030 Berne

Telephone: +41-31-621111
FAX: +41-31-622549
TELEX: 911010 PTT CH

Login Procedure:

User:	Telepac:
Call Telepac.	Telepac will send back a high pitched tone.
Enter D(T) (CR)	Telepac will answer: 4 XXX XXX (Telepac access port number to communicate if trouble.)
Enter: NUI(space)YYYYY	Telepac asks for password: PASSWORD PPPPP
Enter: 4ZZZZZZ (national) 0ZZZZZZ (international)	Telepac will answer: CALL CONNECTED TO ZZZZZZ

Now the data exchange phase may commence. The user may proceed according to host instructions.

Logout Procedure:

User:	Telepac:
To end the call enter: (CTRL)P CLR(CR)	Telepac will answer and then send the disconnection request: CALL CLEARED REMOTE/LOCAL DIRECTIVE

The user may choose to either disconnect the physical circuit, or to log into another host.



United Kingdom 1

PTT Administration: BRITISH TELECOM

PSPDN: PSS

PTT Contact:

Address: PSS
Angel Centre
403 St John's Street
London EC1V 4PL

Telephone: +44-71-2391313 (London area)
+44-61-2366702 (Outside London)

FAX: +44-71-2390943

TELEX: 883040

Telephone Numbers to Access the PSPDN: The access telephone numbers are only valid for the Packet Switching Exchange (PSE) where your NUI is validated. Users receive a list of those numbers with the NUI.

ESANET NUA:

+2342-84400205xx

Application:

ESAPAC

Login Procedure:

User:

Call PSS.

Connect your terminal on line.

Enter: (CR) (CR)XX(CR) where
XX = D1 for VDUs and A7 for
teletype terminals.

Enter: N[Y](CR) where Y = 12
character NUI.

Enter: A[Z](CR)

PSS:

The PSS will send back a high pitched tone.

The PSS will respond with the exchange
identification code. The last six characters and
the port number are not echoed to the terminal
that has been connected.

The PSS will ask: ADD?

The PAD shows that the call has been
established: [NUA]+COM

For UK calls, the NUA should be (CR) (LF) used, less
the prefix 234.

For international calls, the NUA should be
prefixed by 9.

Now the data exchange phase may commence. The user may proceed according to host instructions.

Logout Procedure:

User:

To end the call enter:
(CTRL)P

CLR

PSS:

PSS will answer and then send the disconnection
request CLR DTE

The user may choose to either disconnect the physical circuit, or to log into another host.

United Kingdom 2

PTT Administration: MERCURY

PSPDN: PDS

PTT Contact:

Address: PDS
New Mercury House
26 Red Lion Square
London WC1R 4HQ

Telephone: +44-71-5282000
FAX: +44-71-5288121
TELEX: 910000 MERCOM G

Telephone Numbers to Access the PSPDN:

City:	Prefix/Number:	Speed (bps):
United Kingdom	71-8475915	300
	71-8476040	1200

Login Procedure:

User:	PDS:
Call PDS (see numbers above).	The PDS will send back a high pitched tone.
Connect your terminal online.	PDS will request for your terminal identifier.
Enter your terminal identifier.	The PDS will display MERCURY DATA SERVICE followed by the number of the node to which you are connected and the port. Then, it will request you to logon.
Now you may require a control character. Then, enter your user name followed by a (CR)	The PDS will ask for your password.
Enter: <P> (CR) If password is not required, (duplex terminals) type: ",",<P>(CR)	The password is not echoed in full. The PDS will ask for host address.
Enter <Z>(CR), where P = NUI and Z = NUA	

Now the data exchange phase can commence. The user may proceed according to host instructions.

After the user has logged off from the host computer, he/she may choose to either disconnect the physical circuit, or to log into another host.



VIII. Indices

VIII. Indices

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B. Systems and Networks

Data System

CDAW
CSDS
CRRES
DMSP Auroral Oval Data Base
EXOS-D
GGG (ISTP)
GEOTAIL
MAX '91
MD
MPI Extraterrestrial Physics
NODIS
PDS Central Node
PDS Geoscience Node (IRPS)
PDS NAIF Node
PDS Planetary Atmospheres Node
PDS Planetary Plasma Interactions Node
PDS Rings Node
PDS Small Bodies Node
RAL GDF
SDDAS (DE)
SELDADS
SELSIS
SMM DAC

SOHO
SSC
UARS

UCLASSC

Direct Networks

NSI/DECnet, Internet
ESIS, NSI/DECnet
NSI/DECnet
NSI/DECnet
N-1
NSI/DECnet
N-1
NSI/DECnet, Internet
NSI/DECnet
NSI/DECnet, Internet
NSI/DECnet, Internet
NSI/DECnet, Internet
NSI/DECnet
NSI/DECnet, Internet
NSI/DECnet, Internet
NSI/DECnet, Internet
NSI/DECnet
JANET
NSI/DECnet, Internet
None, dial up only
NSI/DECnet, Telnet
NSI/DECnet, Internet
(available last quarter of 1990)
NSI/DECnet
NSI/DECnet
UARSnet, NSI/DECnet,
Internet
NSI/DECnet, Internet

C. Networks and Systems

Direct Networks

ESIS
Internet

JANET
N-1

NSI/DECnet

Telnet
UARSnet

Data Systems

CSDS
CDAW
MAX '91
MPI
NODIS
PDS
PDS NAIF Node
PDS Planetary Plasma Interactions Node
PDS Rings Node
SSDAS
SMM DAC (available last quarter of 1990)
UARS
UCLASSC
RAL GDF
EXOS-D
GEOTAIL
CSDS
CDAW
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GGG (ISTP)
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SELSIS
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